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AN EXPLORATORY STUDY OF THE RELATIONSHIP BETWEEN HIGH SCHOOL BUILDING DESIGN AND STUDENT LEARNING. FINAL REPORT.

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DESCRIPTORS- *GROUP BEHAVIOR, *HIGH SCHOOLS, *INTERACTION, *SCHOOL DESIGN, *SPATIAL RELATIONSHIP, GROUP DISCUSSION, INTERVIEWS, PSYCHOLOGICAL NEEDS, QUESTIONNAIRES, SCHOOL SPACE, STUDENT NEEDS,

AN EXPLORATORY STUDY WAS MADE OF THE INFLUENCE OF HIGH SCHOOL BUILDING DESIGN UPON THE QUALITY AND QUANTITY AT STUDENT INFORMAL INTERACTIONS, AND THE NATURE AND CONTENT OF SUCH INTERACTIONS. THREE HIGH SCHOOLS WERE STUDIED, AND QUESTIONNAIRES AND INTERVIEWS WERE USED WITH THE 1631 STUDENTS IN THE TOP TWO GRADES. CONCEPTS WHICH WERE IDENTIFIED INCLUDED--(1) SYMBOLIC OWNERSHIP OF SPACES, (2) PSYCHOLOGICAL CENTERS, (3) STUDENT SOCIAL SCHEDULES, (4) MIX, AND (5) COHESIVE VERSUS ISOLATING BUILDINGS. CENTRAL OR COHESIVE BUILDING LAYOUTS PRODUCED LARGER NON-ACADEMIC GROUP DISCUSSIONS, WHILE EXTENDED OR ISOLATING LAYOUTS RESULTED IN SMALLER GROUPS, AND MORE ACADEMIC DISCUSSION. (MM)

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Project No. 5-8006
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An Exploratory Study of The Relationship Between High School Building Design and Student Learning

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Health, Education, and Welfare

Office of Education
Bureau of Research

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An Exploratory Study of The Relationship Between High School Building Design and Student Learning

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TABLE OF CONTENTS

	Page
Acknowledgements	
List of Summary Tables and Figures	
INTRODUCTION	
1. Statement of Research Focus and Strategy	1
2. Description of Related Research	3
3. Theory	7
4. Objectives	10
METHOD	
1. Description of Schools	10
2. Selection of Subjects	20
3. Description of Measures Used and Data Collection Process	21
RESULTS	25
Questionnaire Item #1 -- Time When Interaction Occurred	29
Questionnaire Item #2 -- Number of Participants	31
Questionnaire Item #3 -- Identity of the Other Participants	34
Questionnaire Item #4 -- Who Started Interaction	36
Questionnaire Item #5 -- Location Where Interaction Occurred	36
Questionnaire Item #6 -- Activities Engaged In By Participants When Interaction Began	40
Questionnaire Item #7 -- Activities Engaged In By Other Participants When Interaction Began	43

Page

Questionnaire Item #8 -- How Student Took Part In Interaction 44

Questionnaire Item #9 -- Content of Interaction 45

Questionnaire Item #10 -- Main Purpose of Interaction 54

Questionnaire Item #11 -- Whether Purpose Was Accomplished 61

Questionnaire Item #12 -- Approximate Amount of Time Interaction Took 62

Questionnaire Item #13 -- Whether There Was Enough Time for Interaction 63

CONCEPTS EMERGING FROM THE STUDY

1. Symbolic Ownership of Spaces 67

2. Psychological Centers 67

3. Student Social Schedules 69

4. Mix 69

5. Cohesive vs. Isolating Buildings 71

SUMMARY 73

SUGGESTED RELATED READINGS 75

APPENDIX

A - High School Interaction Inventory 78

B - Full Tables 81

LIST OF FIGURES AND TABLES

		Page
Figure 1	Summary of Differences Among the Three School Buildings	16
Figure 2	Plan of First Floor of School X	17
Figure 3	Plan of Lower Level and First Floor of School Y	18
Figure 4	Plan of First Floor of School Z	19
Table No.		
1	Recorded Interactions Broken Down by School, Sex, and Grade	28
2	Time of Occurrence of Interactions	30
3	Number of Participants in Interactions	32
4	Locations of Interactions Involving Five or More Participants	33
5	Activities Engaged in By Participants When Two-Person Interactions Began	33
6	Sex and Status of Participants In Interactions	34
7	Grade-Levels of Participants in Interactions	35
8	Locations of Interactions with Teachers	35
9	Locations of Interactions	37
10	Grade-Levels of Participants in Hallway Interactions	38
11	Comparison of Course Work Content and Locations of Interactions	39
12	Activities Engaged in By Participants When Interactions Began	41

Table No.		Page
13	Comparison of Length of Interactions and Activities Engaged in by Participants When Interactions Began	43
14	Extent of Self-Perceived Participation in Interactions	44
15	Extent of Self-Perceived Participation in Interactions Compared with Size of Group	45
16	Content of Interactions	48
17	Single-Content Compared with Multiple-Content Interactions	50
18	Subject Matter of Single-Content and Multiple-Content Interactions	51
19	Course Work Content of Multiple-Content Interactions	51
20	Comparison of Length of Interactions and Single-Content and Multiple-Content Interactions	52
21	Comparison of Amount of Time and Content of Interactions	54
22	Purposes of Interactions	56
23	Purposes of Course Work Interactions	57
24	Comparison of Purposes of Interactions with Locations	60
25	Accomplishment of Purpose of Interactions	61
26	Length of Interactions	62
27	Accomplishment of Purpose Compared With Adequacy of Amount of Time for Interactions	64
28	Length of Interactions Compared with Adequacy of Amount of Time	65

LIST OF FULL TABLES

Question No.		Page
1	"Time When Interaction Occurred?"	82
2	"Total Number of Participants in Interaction?"	83
3-A	"Who Were the Other Participants in the Interaction?"	84
3-B	"Were Other Participants in the Interaction from the Same or Different Class-Level?"	85
5	"Location Where Interaction Occurred?"	86
6	"What Was Student Doing When Interaction Began?"	87
8	"How Student Took Part in Interaction?"	88
9-A	"Single-Content or Multiple-Content?"	89
9-B	"Content Related to?"	90
10	"Student's Main Purpose in Participating in Interaction?"	91
11	"Was Student's Purpose Accomplished?"	92
12	"Amount of Time Spent on Interaction?"	93
13	"Sufficient Time for Interaction?"	94

INTRODUCTION

1. Statement of Research Focus and Strategy

This report presents data from an exploratory study of the influence of high school building design upon the quality and quantity of student informal interactions. The study sought to find out what kinds of interaction typically exist among high school students; how much of the interaction is academically-related in its content; and how the architectural design of the school building influences patterns of interaction. It was felt that obtaining preliminary descriptive data about typical patterns of interaction among high school students might be valuable in itself to educators, and in addition could provide a useful basis for further research studying the effect of architecture on behavior.

Informal interactions were defined as all conversations between students, or between students and teachers, which take place in the school building and on school grounds during the academic day, and are not part of the regular instructional procedure. Informal interactions were chosen as the unit of study because these represent behavior that lies at the more spontaneous and voluntary end of the interactional continuum; consequently we had speculated that informal interactions may be more directly influenced by the building's architectural design than are formal interactions. We also had speculated -- basing our assumptions upon commonly accepted theories of social psychologists about communication and attitudes -- that the informal interactions of students may importantly affect the learning process by supplementing the formal classroom process of acquiring factual material, and by shaping attitudes toward learning.

The general research strategy consisted of selecting three high schools which each represented what appeared to be considerable differences in architectural design and layout; of collecting data about the interactional behavior of the students at each school; and of then examining whether the differences in patterns of interactional behavior could be related in part to differences in the architectural design of the schools. After the investigators familiarized themselves with the schools' architectural design, the first step in the study consisted of collecting data about student informal interactions, by means of a written questionnaire, in order to identify the types of interactions and the locations in the schools where these most often occur. The second step then consisted of using interviews to find out, from the students' standpoint, what characteristics of a certain location or behavioral setting make it especially appropriate for certain types of interactions.

It seemed likely that any effect of architectural design upon interactions would amount to a more passive influence than the influence exerted by the behavioral characteristics of the people in the school building -- i.e. the student body, teachers, and administrators. Nevertheless, the possible effects of the architectural design still remained of interest, for even if it may be more passive in its influence, it usually endures longer and for better or worse often outlasts a succession of user groups.

It should be pointed out here that relatively little is currently known about typical patterns and types of student interaction existing in various educational settings, or what patterns and types of interaction are most beneficial to the formal learning process, or what

influence the building design factors can have upon interactional behavior. The present study undertakes in part to close this gap.

2. Description of Related Research

The general importance of social interaction in shaping attitudes, cognitions, and motivation of individuals has been much studied and amply documented by psychologists, sociologists, and other social scientists. In the school setting -- by means of interactions -- information attitudes, and values are transmitted from the faculty to the students during the learning process. Likewise, information, attitudes, and values are transmitted from one student group to another. An important effect of social interaction in school settings emerges as one considers the nature and influence of the various student subcultures upon each other. It seems likely that social interaction is a key factor in the development and transmission of the value systems of different faculty and student groups, either breaking down or strengthening the barriers between value systems, and thus increasing or decreasing the area of commonly held values.

In considering the effect of interaction on group attitudes and the possible effect upon student learning, the following studies seemed especially relevant. Coleman (1959 and 1960) and McDill and Coleman (1963) have shown how the attitudes of the student group affect both the motivation and learning of its members. Coleman has noted that there can be group restrictions on learning, achieved in much the same way that factory workers establish restrictions on productivity. As with other value systems, student value systems contain certain inconsistencies. For example, McDill and Coleman found that in many high

schools, college plans on the part of students led to higher status in the group; yet at the same time a negative orientation toward academic achievement was also rewarded. In a study of medical students, Becker and Geer (1958) showed how the student subculture influenced what was learned, by identifying and focusing upon what it perceived to be the most important learning tasks in medical schools. These tasks emphasized learning only the material necessary to pass exams, and learning the basic information needed to enter general practice -- hardly preoccupations that would be viewed by a medical school faculty as being ideally the primary goals of learning in medical education.

Turning now to a cnnsideration of the possible effect of school building architecture on student interaction and informal learning, one may cite several studies as relevant. Festinger in his studies of student housing (1960 and 1951) found students living in the middle of a row of apartment houses had more interactions than students living in the end apartments. The apartments located in the middle of the row facilitated more face-to-face meetings which tended to increase social interactions. In addition, students occupying the middle locations were adjacent to more neighbors than students on the ends, thus giving them more choices and greater likelihood of finding others with whom they could interact congenially.

In studying social interaction within school buildings, Gullahorn (1952) and Blake (1956) found that low physical barriers, such as file cabinets in a large study room in a school building, tended to increase the number of interactions between students within the smaller enclosed

sub-space, but tended to decrease the number of students with whom social contact was made. Barker and Gump (1964) report a series of studies which shed light on the interrelationship between the person and his environment. Some of the results deal with the specific effects of school size. In general they found that students are able to enter into more behavioral settings in small schools than in large schools. The explanation for this is that in both larger and smaller schools there are roughly the same number of extracurricular activities and "slots" to be filled. But in smaller schools there are fewer students, which leads to more participation on the part of each student because there are more "slots" per student which have to be filled. The importance of behavioral settings is further documented by Rausch, Dittman and Taylor (1959a, 1959b, and 1960) who produced evidence showing that behavioral settings have a strong effect on regulating the behavior of individuals.

In a study of the possible relationship between design of high school buildings and interactional behavior, Hereford and Hecker (1963) specifically examined the relationship between four building factors, and seven factors relating to interaction and attitudes of both students and teachers. An important facet of this study was that it utilized a systematic survey of many schools to study the effects of variables in school design. To quote briefly from the summary of the results

> Size of school is the single dominant factor with respect to school personnel interaction and attitudes.
>
> The influence of size of schools as a factor can be modified, however, with respect to some aspects of interaction and attitude by related building factors of design and utilization.

> There is no evidence, in interaction and attitude, however, to support a contention that design is a major factor among the 34 schools -- independently of school size or plan of utilization. This should not be construed to mean that design cannot be a factor, for such obviously is the case under experimental conditions. (italics in the original)

The Hereford and Hecker study gives information about such matters as the frequency and types of interaction in large schools as opposed to small schools; the effects of a campus arrangement of buildings as opposed to more compact school designs; and the various effects of the several different building utilization plans (whether by school-within-school, subject area, or grade-level). However, while examining the importance of these factors, Hereford and Hecker do not provide an explanation of how these aspects of building design may influence social interaction.

The investigators writing this report have considered the possible effect of the architecture of school buildings upon student informal interaction and informal learning in several papers (Myrick 1965a and 1965b, and Myrick and Marx, 1967). Interaction can help satisfy some of the important educational requirements, which are that the student needs to be able to learn and integrate the subject matter of his educational program, to develop certain skills,and to acquire favorable attitudes toward learning. In their research into the influence of dental school building design upon interactional patterns among dental students, the investigators found some evidence indicating that architectural variables, such as the layout of a building, and the size and placement of its component spaces, can contribute to the meeting of these educational requirements by affecting interaction between students and between students and faculty. In one pilot study it was possible to identify a

number of specific locations in dental school buildings -- including hallways, locker-rooms, and clinical laboratories -- where many interactions leading to informal learning tended to take place. In another pilot study it was found that a correlation existed between how interested the dental students felt the instructors were in the students, and how much the general layout of the building helped the students to see relationships between the various courses of their training program. Thus it may be that the general architectural layout of buildings can contribute in various ways to helping students better understand the underlying unity of their educational program, one way being by making many aspects of the program visible to them as they move about the building. Still another finding was that as the arrangement of the building facilitates more interaction between faculty and students, the building is viewed as being a warmer and more friendly place.

The findings of the pilot studies described above suggest some of the ways in which student informal interaction may contribute to the informal learning process, and thus to the overall effectiveness of the formal learning process. In addition, the findings indicate that the architectural design of educational buildings may have an influence both on the quality and quantity of student informal interaction.

3. Theory

In the light of the related research, the investigators theorized that:

(1) Learning in educational facilities occurs both through formal and informal processes, involving contacts among teachers and students, and among students, in a series of formal and informal interactions.

(2) Only portions of the learning process occur through the formal activities of class instruction.

(3) Therefore, the effectiveness of the learning process is also in part dependent on a variety of informal social interactions, since many of the interactions that contribute importantly to learning are essentially informal. Part of the job of reinforcing, clarifying, discussing, and generalizing what has been heard in the classroom may often be best accomplished by means of spontaneous, informal conversations, which occur during a class period, between class periods, or during some other part of the school day.

While informal interactions can have a direct and important influence on the learning process, not all kinds of learning benefit from social interaction. In addition, the influence may be positive or negative. Depending upon the circumstances, negative influence might be caused by informal interactions expressing sustained opposition to the goals and values of the educational institution, or opposition to the means used by the administration and faculty for reaching these goals. This opposition results when there are wide and strongly felt differences between the value systems of an educational institution and its student body. In this kind of situation, the students may strive to punish the administration and faculty by restricting their learning and conducting counter-institutional activities; consequently their informal interactions will support and promote this behavior.

However, student informal interaction can be an equally potent force in giving positive support to the goals and values of the institution, and to the learning process. It can contribute to learning in many ways: by reinforcing what has been presented in the formal learning situation; by leading to the clarification of learned materials and the sharing of student insights; by contributing to favorable student

motivation through shared positive attitudes expressing interest and enthusiasm in the learning; by helping students understand the relationships between the various subject-matters they are learning; and by helping them see how the educational program relates to their future occupational goals, together with perceiving the other future rewards and utilities of their educational experience.

In theorizing about how the architectural design of educational buildings might influence behavior, the following design characteristics were considered by the investigators to be of interest: the compactness or extendedness of the building; the location, layout, and interrelationships of various building components such as classrooms, offices, lounges, cafeteria, auditorium, gymnasium, and library; sizes of these spaces; the kind of corridor system and the number of corridors, stairways, and corridor intersections; the number and placement of entries into the building; and the number of stories. It was felt these design characteristics might influence the quantity and quality of informal conversations by affecting such factors as: the amount of face-to-face contact between individuals in the building; the pattern of traffic flow and number of alternative routes; the existence of suitable gathering and talking spots on routes; and the heterogeneity or homogeneity of the "mix" of individuals composing conversational groups, and the size of these groups. It seemed likely that these factors could influence interaction by determining, in part, which persons who were in movement were likely to encounter each other in ways that permitted interaction; as well as whether persons who were stationary in rooms were grouped so they can talk while involved in certain learning tasks. Thus one architectural environment

might provide more opportunity for interactions than another by encouraging people to use certain routes in going from one point to another, by regulating the size of various groups, by providing settings for interactions which were more public or private, by organizing activities in certain places, and so on.

4. Objectives

The purpose of the research was to conduct an exploratory study of the relationship between the design of high school buildings and the kinds of informal student interactions and informal learning occurring there.

The specific objectives of the study were:

1. To describe the student informal interactions which occurred in three different high schools, in terms of content, purpose, frequency, and length of the interactions, as well as number of participants, activities engaged in at the time of the interaction, and the relatedness of the interaction to informal academic learning.

2. To identify the architectural locations in the schools where student informal interactions mainly occur.

3. To explain, in terms of student perceptions of the architectural environment, why certain kinds of interaction occur mainly in some locations and not in others.

4. To identify some student interactional needs which are unsatisfied, in part due to the architectural design of the school building.

METHOD

1. Description of Schools

Three secondary schools located in the Washington, D. C. metropolitan area were used in the research. Schools X and Y are large public suburban high schools, while School Z is a small private city

high school. All three schools have predominantly white student populations.

The intention governing the selection of the schools was to hold constant certain factors pertaining to student population[1] and age of the building, while varying a number of architectural factors. Thus the three schools differ in building size and architectural design and layout, but they are similar in factors relating to student population and age of the building,[2] for each has: a new or relatively new school building; an attractive appearance and good maintenance of the building and grounds; high academic standards and high quality of instruction; a position of prestige as an outstanding school in the

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1. Early during the selection process certain guidelines were decided upon so schools would not be selected that represented the following contrasts: (1) high academic attainment vs. low; (2) urban vs. rural location; (3) student population which was predominantly college-bound and had white-collar parents vs. that which was job-bound and had blue-collar parents; and (4) student population predominantly white vs. Negro. The rationale for using these guidelines was to avoid selecting schools and student populations that were very different in non-architectural factors, which might substantially influence the number and kinds of interactions (for example, the number of academically related vs. non-academically related interactions occurring in each school).

2. At the beginning of the study, the intention was to contrast both old vs. new , and large vs. small high school buildings, but it was necessary to modify this. It was found that school systems felt reluctant to permit their older school buildings to be included in a study which also included newer schools, perhaps because of a fear of its leading to unfavorable comparisons and, as a result, to bad publicity. Although School Y is housed in a somewhat older building than the other two schools selected -- with the majority of the building built in 1960, as an addition to a small former elementary school constructed in 1950 -- School Y cannot really be considered an old school, either in its actual age, or its appearance and condition. Therefore, all three school buildings were categorized as new or relatively new, which represents a change from the design originally planned for the research. It was found that all recently built local public high schools were large and therefore did not provide the planned contrast between large and small size. Therefore, a small private city school, which had recently moved into a newly constructed classroom building, was selected to provide the contrast between large and small size school buildings.

community; an unusually large percentage of students who are college-bound; and a higher than average expenditure per pupil. However, although it was viewed as a relatively important factor, no attempt was made in selecting the schools to hold constant the "administrative climate" -- consisting of such factors as the strictness of the rule system and its enforcement, and how the administrative staff was perceived by the rtudents.[1] This was due to the difficulty of finding schools both with similar administrative system and differing architectural characteristics, while at the same time selecting on the basis of a number of other important factors.

Architecturally, the three schools selected differ in the building's size, layout, compactness, the number of entrances and lobbies, stories and staircases, and the number and kinds of corridors and corridor intersections. The differences between the architectural design and layout

---

1. The differences in the "administrative climate" of the three schools will be described briefly to give some of the flavor of how each school was operated. School X is an innovational and experimental public high school, which is trying out many of the newer educational techniques. It has attracted widespread interest and a constant stream of visiting educators who come to scrutinize both the design of the school and its educational activities. The innovative building design and layout were deliberately planned to help give the students an academic situation leading to the development of individual responsibility and self-determination in planning and carrying out their weekly "menu" of academic activities, which includes considerable independent study. The administrative approach used in the school seeks to give students considerable personal freedom and substantially emphasizes principles of democratic management, rather than principles of more traditional autocratic management used in most schools. The atmosphere is unusually informal and friendly for a public high school of this size.

The administrative approach used in School Y is a traditional one, and there is a somewhat impersonal atmosphere such as is typically found in large high schools. By contrast, in School Z, although the administrative approach used is also traditional in most respects, the small enrollment and the small size of classes there create a friendly atmosphere in which most of the teachers and students know each other. In addition, emphasis is placed upon giving each student individual attention and encouraging personal responsibility and a considerable amount of freedom on the part of the students.

of the three schools will be presented in the following pages by means of a brief description, a summary chart (Figure 1) and a drawing of each school (Figures 2, 3 and 4).

School X is a large suburban public high school. The building contains approximately 159,000 square feet of space and is the second largest of the three schools studied. The school occupies a "T-shaped" building, with both of the rectangles forming the "T" quite broad rather than long and extended, so the building is fairly compact in its layout. It is two stories high, with the second story almost completely superimposed on the first story, except in the case of a few parts of the building which are only one story high, such as the library. As a result, the layout of the building is quite easy for a newcomer to understand. School X was planned so it incorporates a number of innovations in both its design and teaching. Chief among the innovations are a "resources center," which represents a broadening of the concept of library use; an "instructional center," containing a great variety of audio-visual teaching aids in a space that doubles as an auditorium; and a combination of small seminar rooms and large team-teaching rooms, used predominantly in place of conventional size classrooms which are relatively few in number (See Figure 2).

School Y is also a large suburban public high school, and largest of the three schools, both in terms of square footage and enrollment. The building contains approximately 178,000 square feet of space, excluding its unroofed courtyard. The building is constructed around a large nearly square grassy courtyard, which is surrounded on all four sides by building elements of different widths containing corridors,

classrooms, and other parts of the school.[1] From this roughly square formation built around the center courtyard, a number of wide stubby wings protrude, giving the perimeter of the building a highly irregular shape. Of the schools studied, School Y is the least compact and most complicated in its layout. Parts of the building are three stories high, but because the school is located on a sloping site and has had many additions built on to its original elementary school building core, there are many structural variations from one wing to the next and from one story to the next. The stories are only partially superimposed on each other, with part of the school one story high, part of it two stories, and part of it three stories. Therefore, when drawn in outline, each story is quite different in shape, giving the building a complex and rather confusing labyrinthian layout (See Figure 3).

School Z is a small city private high school. It is laid out on a campus plan, which consists of several school buildings located some distance apart and connected by uncovered outdoor walkways that cross the grassy open campus. The main classroom building -- which was the building primarily studied because it was the building in which most of the students and courses were situated -- is constructed in the shape of a simple rectangle, and thus it is the most compact of the

---

1. Plans are underway for the construction of additional space, which will eliminate the pleasant grassy courtyard with the sentimentally-regarded large old tree in its center, and will provide more classrooms and a larger more modern library.

three school buildings in its layout. However, it should be noted that the library is in a connecting building, the gym in still another building, and some classes are held in an additional small building nearby. The main classroom building contains approximately 60,000 square feet of space, and it is the smallest of the school buildings studied. It is three stories high, with each floor completely superimposed on the one below it, which gives the building an especially easy to understand layout (See Figure 4).

Schools X, Y and Z may be viewed as falling along a continuum for each of a number of building factors, rather than as representing sharp contrasts. The following chart summarizes the differences described above (see next page):

FIGURE 1

Summary of Differences Among the Three School Buildings

	School X	School Y	School Z
AGE	New (opened in fall of 1963)	Less New (mostly built in 1960)	Newest (This replacement for an older campus building opened in fall of 1964)
SIZE OF BUILDING	Large (2½ times size of School Z)	Slightly larger (3 times size of School Z)	Small
DESIGN	Innovational	Traditional	Traditional
COMPACTNESS	Fairly Compact	Least Compact	Most Compact
SHAPE	T-Shape	Hollow Square with Wings	Rectangle
NUMBER OF STORIES	2	3	3

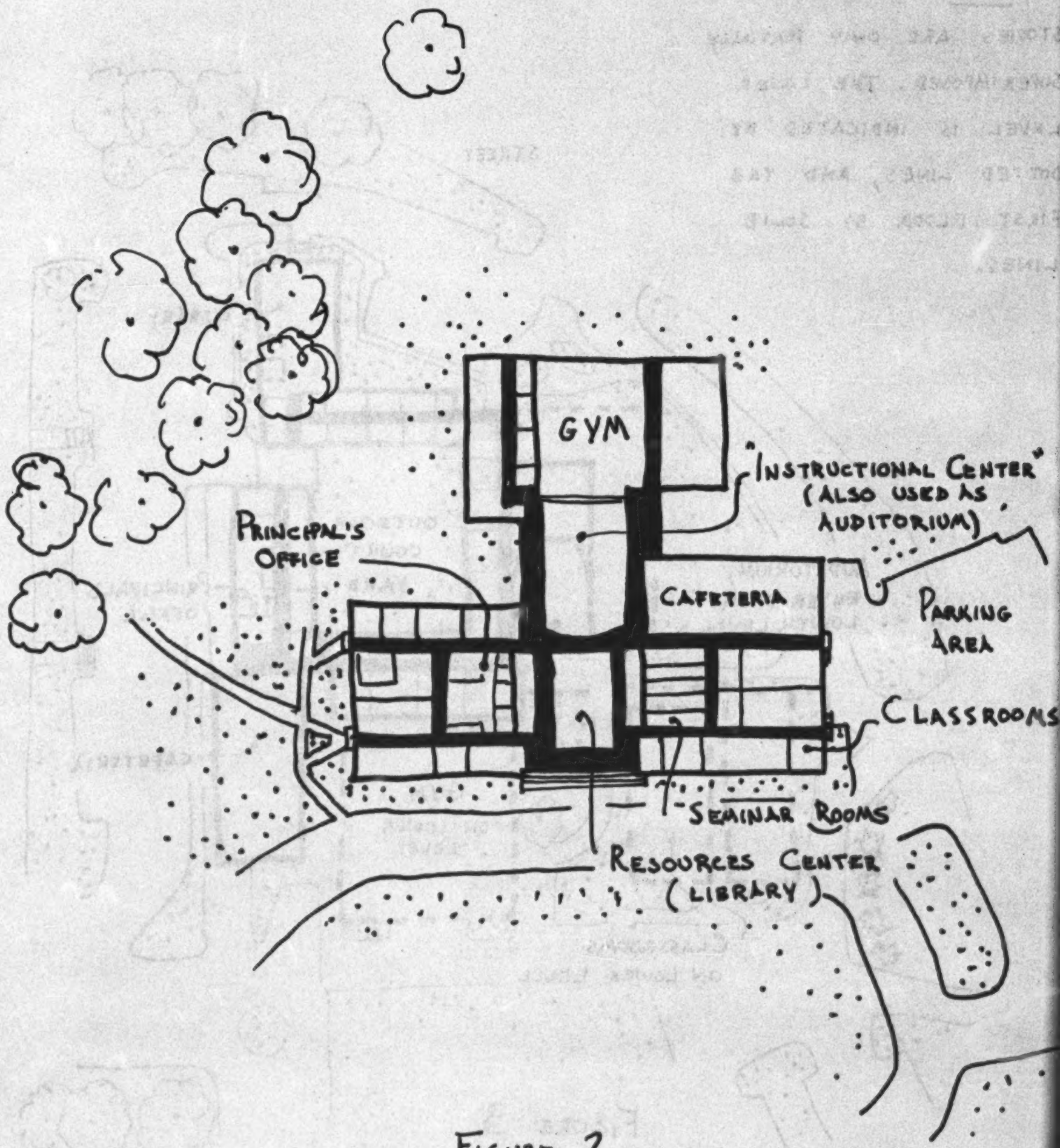

FIGURE 2
PLAN OF FIRST FLOOR
OF SCHOOL X

SCALE: 1 INCH = 100 FEET

NOTE - THESE TWO
ORIES ARE ONLY PARTIALLY
ERIMPOSED. THE LOWER
VEL IS INDICATED BY
TED LINES, AND THE
ST FLOOR BY SOLID
NES.

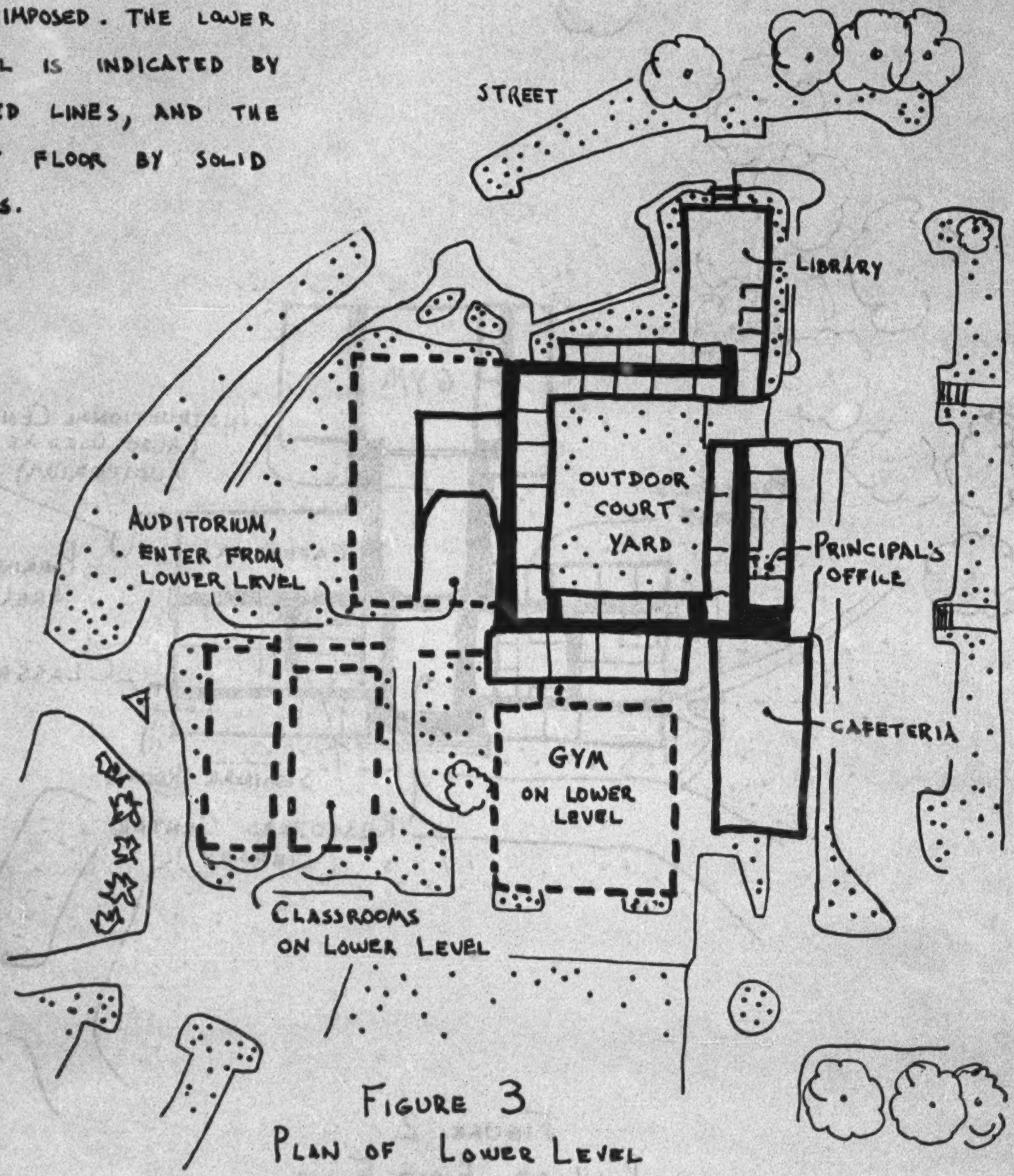

FIGURE 3
PLAN OF LOWER LEVEL
AND FIRST FLOOR
OF SCHOOL Y

SCALE: 1 INCH = 100 FEET

NOTE – THE CAFETERIA AND AUDITORIUM ARE NOT SHOWN IN THIS SKETCH AS THEY ARE LOCATED IN THE BASEMENT OF THE MAIN BUILDING.

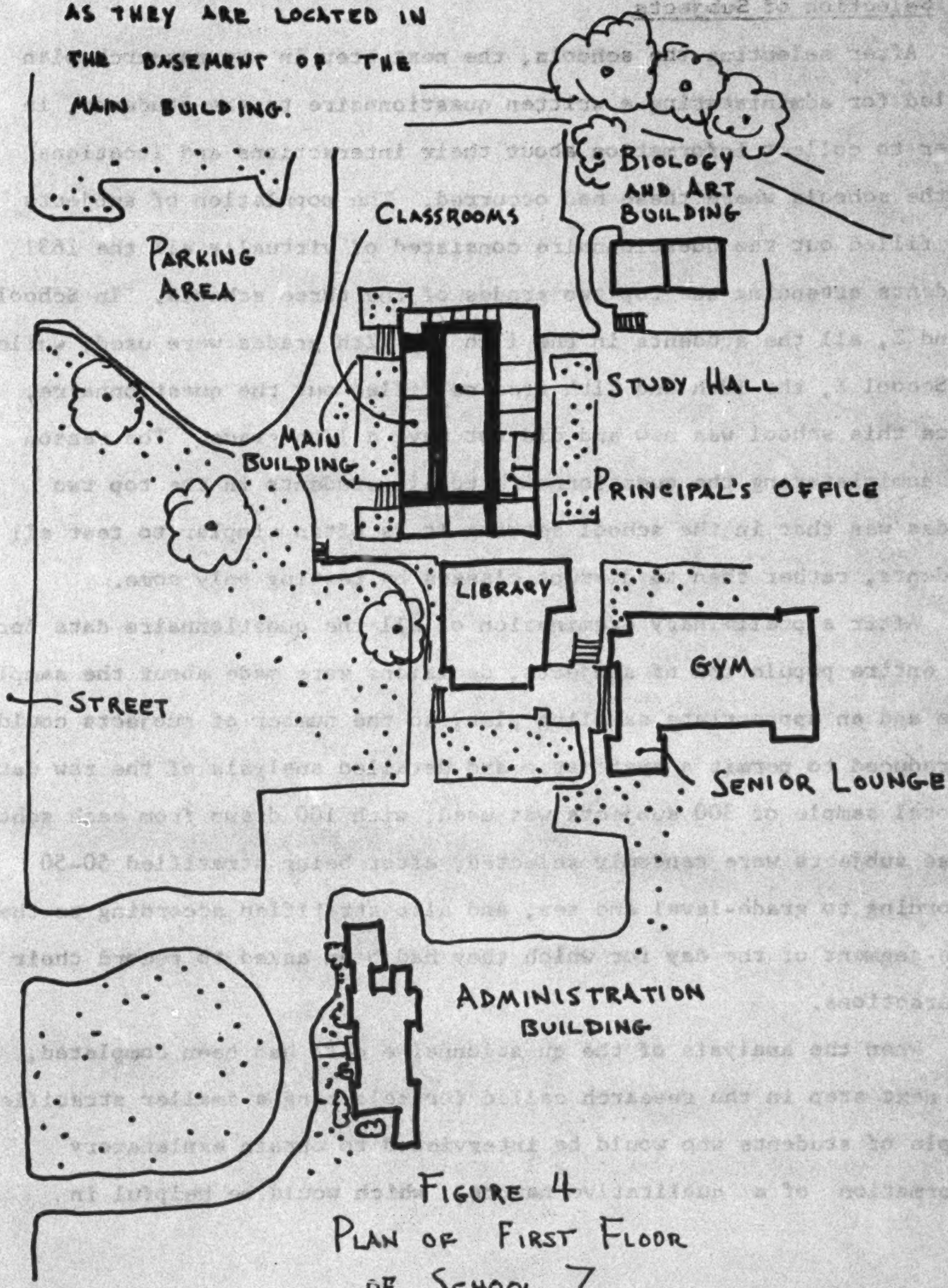

FIGURE 4
PLAN OF FIRST FLOOR OF SCHOOL Z

SCALE: 1 INCH = 100 FEET

2. Selection of Subjects

After selecting the schools, the next step in the research plan called for administering a written questionnaire to the students, in order to collect information about their interactions and locations in the schools where these had occurred. The population of subjects who filled out the questionnaire consisted of virtually all the 1631 students attending the top two grades of the three schools. In Schools Y and Z, all the students in the 11th and 12th grades were used; while in School X, the 10th and 11th graders filled out the questionnaire, since this school was new and did not have a 12th grade. The reason for administering the questionnaire to all students in the top two grades was that in the school setting it is often simpler to test all students, rather than to disrupt classes by testing only some.

After a preliminary examination of all the questionnaire data for the entire population of subjects, decisions were made about the sample size and an appropriate sampling plan, so the number of subjects could be reduced to permit a systematic and detailed analysis of the raw data. A total sample of 300 subjects was used, with 100 drawn from each school. These subjects were randomly selected, after being stratified 50-50 according to grade-level and sex, and also stratified according to the time-segment of the day for which they had been asked to record their interactions.

When the analysis of the questionnaire data had been completed, the next step in the research called for selecting a smaller stratified sample of students who would be interviewed to obtain explanatory information of a qualitative nature, which would be helpful in

interpreting the questionnaire data and relating the findings to the architectural design and layout of each school. Out of the sample of 300 subjects for whom the questionnaire data had been analyzed, a further sample of 90 students was randomly selected, with 30 students drawn from each school.

The sample of subjects who were interviewed was stratified not only by grade-level, sex, and time of day for which they had recorded their interactions, but also according to whether their interaction rates were high or low. The reason for stratifying according to interaction rates was that it was thought this variable might be important, and therefore it seemed desirable to insure that both students who had few interactions and those who had many interactions would be interviewed, in order to help develop explanations for why interactions occurred with different frequencies in the various locations of the school buildings.

3. Description of Measures Used and Data Collection Process

As already stated, data for the study were collected by means of two kinds of measures: (1) a written questionnaire, in which the students recorded information about their interactions and the locations in school where these had occurred; and (2) an interview schedule, in which students were asked questions aimed at finding out what their perceptions of the architectural environment were, and why certain types of interactions occurred mainly in certain locations of the school buildings. In addition, the investigators recorded their on-site observations about the design and layout of each school, which provided further information about each of the three architectural environments.

This material was later utilized to help in interpreting the data.

The written questionnaire, titled the "High School Interaction Inventory" (See Appendix A, page 78), collected pertinent biographical data and obtained the student's recording of all the informal interactions in which he or she had participated during a specified portion of the school day. Informal interactions were defined as all student conversations taking place in the school building or on school grounds during the academic day, except those conversations occurring among students, or among students and teachers as a part of the regular classroom instructional procedure. The intent was to guide the students, but not bias them in providing the required data. Therefore, in the questionnaire instructions, which were read aloud, the students were told that the investigators were interested in the informal communication process occurring in schools, and that they should therefore record all their informal conversations, including even those which seemed very brief or trivial. However, no reference was made to the investigators' interest in the number of conversations occurring, or academic vs. non-academic interactions, or architectural implications.

To help the student record in a convenient format all the necessary information about each interaction, a series of questions with sample answer-choices were furnished, down the left column of each questionnaire recording sheet. Students were told to select from the answer-choices and write these in where appropriate, or otherwise to devise their own descriptive answers to fit the interaction being recorded.

The recording sheets provided for the collection of systematic information about each interaction, consisting of such items as: the

time and date when the interaction occurred; the number of participants, and the activities they were engaged in at the time of the interaction; the content of the interaction (e.g., whether it related to classwork, homework, teachers, school administration, future college or job plans, extra-curricular activities, social life, or personal matters; the main purpose of the interaction (e.g., whether its purpose was to give information, obtain information, express an opinion, socialize, gripe, kill time, or just be friendly); and the amount of time the interaction lasted. At the end of the questionnaire, some additional related recording tasks were furnished for students who finished recording early in the period.

The questionnaire was administered to classes of students <u>throughout</u> the regular periods of the day, as they were assembled in required basic classes. In this way it was possible to give the questionnaire to all students with a minimum of disruption to their normal class schedule. But there was a more important reason for this strategy. It was realized that students could not be expected either to remember or to write fast enough to record all their interactions for an entire school day. Therefore, to reduce the recording task to a reasonable length, the day was divided into parts, and the students during each class period were asked to record only their informal interactions which took place during a certain specified portion of the day. By reducing the recording task to manageable limits, the likelihood was reduced of losing interactions either through inability to remember or lack of recording time.[1] So students would remember their interactions clearly,

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1. In the case of a student who had had a greater number of interactions than he could record during the class period, he was asked to estimate the number of interactions not recorded. There was probably both a little under-recording and over-recording. But the fact that some students recorded as few as one interaction, while other students giving estimates of unrecorded interactions, had recorded many interactions, suggests that the majority recorded in good faith. This impression was supported by comments made in the interviews.

each group filling out the questionnaire recorded their interactions which had just occurred during the previous time segment. Since each group covered a part of the school day, we were able to obtain data that sampled the interactions occurring throughout the entire day, providing a kind of composite of the school's interactional day.

In devising the interview schedule, the questionnaire data was examined, certain differences and similarities among the schools were noted, and questions were constructed to obtain explanations from the students. Additional questions were used to obtain: the student's perce ptions of the school building's architectural design and layout; further specifications of locations and circumstances in which interactions took place; information about the main gathering places, or "psychological centers" where large groups of students congregated in the buildings; and the various needs that informal interactions satisfy, as well as ways in which such interactions contribute to the informal learning process. Detailed diagrams of the layouts of the entire school building were used in conjunction with a number of these questions to elicit and record the qualitative data more exactly.

RESULTS

This section presents the quantitative data about informal interactions, obtained from analysis of the responses to the written questionnaire made by the randomly selected, stratified sample of students. The qualitative explanatory data obtained from the interviews are incorporated in the report as part of the interpretive material. The procedure for analyzing the questionnaire data consisted of scoring and categorizing the responses to each item, and then figuring percentage distributions. Following this, cross-tabulations were carried out for a number of items which seemed of special interest. Additional cross-tabulations and analyses might have been fruitfully performed, if the funds available for data analysis had been less limited.

The somewhat unconventional format of this section needs a few words of explanation. Since this is an exploratory study which presents a considerable amount of data pertaining to a large number of factors, it was realized that it would be difficult for the reader to understand and respond to the findings if the customary format for a results section were followed, consisting only of the statistical tables and brief explanations, with the bulk of the explanatory and interpretive material coming later in the discussion section. The customary format would have caused tables and interpretive material to be quite separated. It was decided the presentation would be more meaningful if these were presented together.

For the reader's convenience, short summary tables based on the full tables have been used in the results section, and the full tables -- showing the responses to each item on the questionnaire, broken down by school, grade-level, and sex -- have been placed in the appendix. (See Appendix B, pages 81 - 94). The reader will notice that in the

short summary tables, the data for all three schools are only presented part of the time. Thus, it should be explained what is the pattern underlying the schools selected to represent the data in the summary tables. On these short tables, if the data on the full tables for each of the three schools were quite similar, then the data for one school are used to give a quick visual summary of a trend shared in common by all the schools. In these cases, the school selected is chosen on a rotating basis, so that one school will not be used to represent the similar data throughout the results. The three schools are only compared in short summary tables when this would be of interest to make a particular point, for example, when there are important differences, or when anticipated differences turn out surprisingly not to exist. In the cases when there was a hypothesis about a particular behavioral or architectural factor which one school exemplified especially, it seemed appropriate to use the data for that school in the short table. At any time more information is desired, or additional comparisons wanted, all the data are available in Appendix B.

The reader is cautioned to remember that all the data about interactions used in this study was obtained from self-reports of individuals, and therefore the inferences made reflect the limitations of data derived from personal judgments and estimates. In addition, the reader is cautioned to remember, in responding to the data about interactions, that the three high schools used in this exploratory research have some special and rather atypical characteristics (as described in the section about selection of the schools). These schools are "prestige" schools, with high academic standards and an unusually large percentage of college-bound students. If data were collected in other types of schools

-- for example, in slum schools -- the findings might be very different. A future study, using a considerably larger sample of schools, which would compare several different types of schools, and examine the similarities and dissimilarities in the behavioral characteristics of the interactions, would provide a very interesting follow-up to this exploratory study.

In a preliminary analysis of the questionnaire data, it was found that informal interaction totals for each of the three schools were somewhat affected by the grade-level of the students, with the 10th grade reporting significantly fewer interactions. For this reason, the original plan of analyzing a sample of all the data collected was modified. It was decided that the data obtained for the two upper grades in each school should not be combined and used in the analysis, as 10th grade data were not comparable with 12th grade data and would place School X, which had no 12th grade, at a disadvantage in comparing informal interaction rates for the three schools. Therefore, with the exception of Table 1, throughout the results section comparisons will be made of the responses which 11th grade students gave in answer to each item, since the 11th grade was the one grade common to all three schools, and the data for it were quite uniform -- thus giving a good basis for comparison.

The lack of comparability of the data for the 10th and 12th grades is shown in Table 1, which summarizes the total number of informal interactions recorded for the sample of 300 subjects drawn from the three schools:

TABLE 1

Recorded Interactinns Broken Down
By School, Sex, and Grade

	School X (N=100)		School Y (N=100)		School Z (N=100)	
	Boys (N=50)	Girls (N=50)	Boys (N=50)	Girls (N=50)	Boys (N=50)	Girls (N=50)
Interactions						
10th Grade	117	127	--	--	--	--
11th Grade	128	161	123	162	124	140
12th Grade	--	--	138	179	125	148

Note: Each of the column figures in this table represents the number of interactions recorded for a subsample of 25 students.

It can be seen that, in addition to the slight trend of higher grades reporting more informal interactions than lower grades, there is a marked trend toward the females reporting more interactions than the males. However, when making comparisons between the schools, holding sex and grade-level constant, the results are quite uniform. For the 11th grade boys, only small differences exist among the schools. For 11th grade girls, Schools X and Y are nearly the same, although girls in School Z had fewer interactions.

In thinking about these data, it should be remembered that the data were collected in a series of assigned recording periods, which cumulatively spanned the school day, but with each group of students reporting only a part of the day. The form of the data, and the fact that only interactions for one day were sampled for each school, do not permit an exact statement of the mean number of informal interactions these students had during the entire school day. However, it can be estimated that for the typical 11th grade student, the number of informal interactions fell between 35 and 40 for the entire school day.

The short summary tables of the data derived from the responses to each questionnaire item will now follow. The material presented for each item will explain why the question was asked, how the responses were analyzed, and what the findings were. The data will uniformly consist of 11th grade data, based on a sample of 150 students, with 50 students drawn from each of the three high schools. The randomly selected sample was stratified according to sex (25 males and 25 females from each school), and also stratified according to the time-segment of the day for which the students had been asked to record their interactions.

Questionnaire Item #1 -- Time When Interaction Occurred

The purpose of this question was to identify those interactions occurring within the more structured and formal class periods, as opposed to those occurring in the less structured and less formal situations between classes, at lunch, or before and after school. The question was asked because it was felt that the architecture might have more of an influence on interactions occurring in the less behaviorally restricted situations than in the formal classroom situations. In addition, another purpose was to find out if certain portions of the school day were richer in interactions than other portions. Table 2 shows the time when interactions occurred for the 11th grade sample:

Table 2

Time of Occurrence of Interactions

Interactions	Between Class Periods	During Class Periods	During Lunch	Before School	After School
School X (289=100%)	32%	43%	8%	9%	8%
School Y (285=100%)	31%	40%	12%	8%	9%
School Z (264=100%)	34%	36%	17%	5%	6%

Comparing the differences in Table 2 for the number of interactions occurring between class periods, all three schools are nearly the same. One difference is that School X has a slightly larger percentage of interactions occurring during class periods than the other schools. It should be recalled that by definition informal interactions are not related to the regular instructional procedure such as class discussion, and therefore these interactions constitute what teachers refer to as "whispering" or "talking in class." Another difference shown in Table 2 is that School Z considerably exceeds the other schools in the percentage of interactions occurring during the lunch period.

In thinking about the data presented in all the tables, the reader should bear in mind that the number of interactions, which is the way interactions are counted in most of the tables, is separate from the duration or length of interactions. A time period in which there are many interactions does not necessarily mean the students did more talking during that time period than in one with fewer interactions. For example, during a lunch period in which students may have talked almost

continuously, there may be fewer interactions because the conversations are longer and unbroken, while in the halls there may be a much higher number of interactions because of the brevity of each one. To summarize, the number or frequency of conversations cannot be taken as a measure of how much of the time, during a certain time period, was occupied by talking.

In accounting for the two differences noted in the preceding table, it appears that architectural factors may account for the first of them. At School X, the large number of seminar rooms and the small number of regular-size classrooms may lead to smaller and more informal class situations in which more informal interactions are possible during class periods. As for the larger number of lunch period interactions at School Z, here administrative factors probably account for the difference. It should be noted that at School Z all classes in the high school stop for lunch hour, and that after the students finish eating they have 20 to 30 minutes of free time. By contrast, at Schools X and Y the more customary "staggered" lunch schedule is used, and also the students have a shorter lunch period and consequently less free time during which they are able to conduct many of the lengthier conversations which typically occur during lunch.

Questionnaire Item #2 -- Number of Participants

This question was concerned with the size of the groups in which informal interactions occurred, because it was felt that group size might affect the content and purpose of the interactions. The results are shown in Table 3:

Table 3

Number of Participants in Interactions

Interactions	Two	Three	Four	Five	Over Five
School X (289=100%)	54%	24%	8%	5%	8%
School Y (285=100%)	69%	21%	5%	-	5%
School Z (264=100%)	62%	21%	11%	3%	3%

This table shows that School X has more interactions involving five or more students than the other schools. School Y has more interactions involving only two students than the other schools.

There are two architectural factors that may account for the greater number of large-group interactions at School X. It should be recalled that at this school there are many small seminar rooms and relatively few regular-size classrooms. The data show that many of the large-group interactions occur in either the small seminar rooms or in classrooms. It may be that the group structure encouraged in the seminar room setting carries over to the classrooms and causes larger groups to participate in the informal interactions. On the other hand, any of the large-group interactions occurring in the corridors of School X are perhaps explained by the compactness of the school and layout of the corridor system, which bring large groups of students together and give them time between classes to talk while remaining in these groups. The location of School X's thirty-nine large-group interactions are shown in the following table, in order to examine which of these architectural factors is more influential:

Table 4

Locations of Interactions
Involving Five or More Participants

School X	Halls and Stairs	Seminar Rooms and Classrooms	All Other Locations
Interactions (39=100%)	8%	60%	32%

From this table we see that large-group interactions occur mainly in the seminar rooms and classrooms, suggesting that these rooms are more likely to be associated with the cause of large-group interactions, than is the corridor system.

In seeking an explanation for School Y's large number of two-person interactions, it can be speculated that the layout of the building around a central courtyard and its long corridors frequently require the students to travel a comparatively long distance between classes. It follows that interactions involving two persons are more likely to occur than those involving larger groups, since students who are hurrying to class would find it difficult to converse with a group of persons while en route. Table 5 compares two-person interactions occurring in transit at School X, which had the smallest percentage of two-person interactions, with those occurring in School Y:

Table 5

Activities Engaged in by Participants
When Two-Person Interactions Began

Interactions	In Transit	Waiting	All Other Activities
School X (157=100%)	32%	26%	42%
School Y (194=100%)	42%	20%	38%

The 10% difference in favor of School Y tends to support the speculation that its more extended type of building layout may lead to a greater number of two-person interactions.

Questionnaire Item #3 -- Identity of the Other Participants

In this questionnaire item, students were asked to identify the other participants in terms of status (student or teacher), sex, and grade-level, if a student. The purpose was to find out about the heterogeneity or homogeneity of the "mix" of conversational groups, that is, the extent to which students interact with teachers, or with students of the opposite sex, or of different grade-levels. Mix was thought to be important because in a conversational group which has a diverse mix, the student has a chance to meet and interact with students of the opposite sex, of different grade-levels, and possibly of different academic programs. In this situation, the student is more likely to be exposed to different points of view about the courses and activities in the school. A building, by the way it is laid out, may influence which students encounter each other as they go to their classes, and thus may help to influence the diversity of the mix.

Table 6 shows who were the participants in interactions:

Table 6

Sex and Status of Participants in Interactions

Interactions	Same-Sex Student (1 other Participant)	Different-Sex Student (1 other Participant)	Mixed-Sex Students (More than 1 Other Parti.)	Teacher	Unknown
School X (289=100%)	46%	21%	17%	14%	2%
School Y (285=100%)	57%	22%	12%	8%	-
School Z (264=100%)	50%	26%	12%	10%	1%

Table 7 shows the grade-levels of the participants:

Table 7

Grade Levels of Participants in Interactions

Interactions	Same-Grade	Different Grade	Mixed-Grade	Unknown
School X (246=100%)	76%	13%	10%	-
School Y (258=100%)	74%	19%	7%	-
School Z (236=100%)	74%	19%	6%	1%

Note: Discrepancies between the number of interactions shown in Tables 6 and 7 are accounted for by the fact that a teacher interaction is counted in more than one category if it has multiple-content.

One finds relatively little difference between schools in either table with the possible exception of student-teacher interactions. A higher percentage is found at School X, and this is worth exploring further since more informal interactions with teachers might be very desirable in promoting the informal learning of students. The locations in which student-teacher interactions occurred are examined in Table 8:

Table 8

Locations of Interactions with Teachers

Interactions	Halls, Stairs, and Lobbies	Classrooms, Seminar Rooms, and Labs	All Other Locations
School X (41=100%)	17%	57%	26%
School Y (23=100%)	20%	36%	44%
School Z (26=100%)	27%	50%	23%

In this table, the most striking difference is the low number student-teacher interactions occurring in classrooms at School Y. School Y, which has only a small number of student-teacher interctions occurring in classrooms, the long corridors and lack of comctness may provide part of the explanation. Presumably the students nd teachers often have long distances to travel when they change lassrooms, leaving little time for informal student-teacher conversaions in the classroom, either before or after the instructional eriod. By contrast, Schools X and Y are similar in that both have a igher percentage of student-teacher interactions occurring in classooms. At School X, seminar rooms and labs account for a large number f the classroom interactions between students and teachers. An rchitectural explanation for School X's classroom interactions may be he relatively compact layout and the fact that School X has many eminar rooms where students are able to meet teachers on an informal asis. Likewise, the very compact layout of School Z may be one reason hy it too has more classroom student-teacher interactions than School Y.

Questionnaire Item #4 -- Who Started Interaction

The responses to this item were not tabulated and analyzed because, fter a preliminary examination of the raw data, it was decided that the esponses would not contribute to a better understanding of the relaionships between interactions, architectural layout, and the informal earning process.

Questionnaire Item #5 -- Location Where Interaction Occurred

The location where an interaction occurs would appear to be related n part to the architecture, since certain locations may provide

opportunities for students to meet more easily, or talk more freely, or interact in different behavioral settings. Table 9 gives the data for locations of interactions:

Table 9

Locations of Interactions

	Outside Building, on School Grounds	Halls, Stairs,& Lobbies	Cafeteria or Restrooms	Classrooms, Seminar Rooms and Labs	Gym	Li- brary	Un- known
Interactions							
School X (289=100%)	5%	29%	13%	40%	1%	6%	4%
School Y (285=100%)	4%	38%	13%	33%	4%	2%	4%
School Z (264=100%)	3%	34%	11%	42%	2%	5%	1%

The main finding is that, for Schools X and Z, about one third of the interactions take place in the halls, stairs and lobbies, and about 40% take place in the classrooms, seminar rooms, and labs, while with School Y these figures are reversed. The extended layout of School Y, and the many long corridors which the students must travel in changing classes, probably account for this difference. It is interesting to note that the figures in Table 9 fit generally with those of Table 2, dealing with the time when the interaction occurred. As would be expected, most of the interactions occurring in the hallways take place between classes, and most of those occurring in the classroom take place during a class period.

Interactions occurring in the halls, stairs and lobbies are of particular interest; first, because these are spaces where students

can interact with greater freedom, and second, because corridor systems vary more widely among the three schools than many of the other architectural factors. It has been conjectured that some corridor systems tend to keep sub-groups of students relatively isolated, resulting in a smaller number of interactions, or in a more restricted mix. Evidence for any differences among the schools in the number of interactions occurring in the halls was not found, but in examining the data on the grade-level of the students with whom interactions occurred, some differences are found in the heterogeneity or "richness" of the mix, as shown in Table 10:

Table 10

Grade-Levels of Participants in Hallway Interactions

Interactions	Same-Grade	Different-Grade	Mixed-Grade	Second & Third Columns Combined	Unknown
School X (84=100%)	67%	13%	13%	26%	7%
School Y (107=100%)	67%	27%	2%	29%	4%
School Z (92=100%)	67%	18%	7%	25%	9%

However, since School X has already been shown to have more hallway interactions occurring in large-sized groups, and by definition, a mixed-grade interaction has a minimum of three participants, one actually obtains a fairer basis of comparison here if one combines the above percentages for different grade-level and the mixed grade-level, as shown in the third column of Table 10. Viewing the data

this way, there is very little difference among the three schools. Therefore, on the basis of these data, the variable of "richness" of mix does not appear to be influenced by differences in the architectural layout of the three schools.

It had been anticipated that informal interactions taking place in classrooms would be more likely to have an academic content than those occurring in halls, stairs, and lobbies, or other less behaviorally restricted locations. In other words, the nearer the location of the interaction to the instructional setting, the more likely it is to deal with instructional matters. To test this idea, an examination was made of the content of interactions occurring in classrooms, seminar rooms, and labs, compared both with those occurring in halls, stairs and lobbies, and those occurring in all other locations. The data for School Y were used, since this school had the highest percentage of interactions relating to course work (even though its percentage was only slightly higher than School Z). Table 11 shows the results:

Table 11

Comparison of Course Work Content and Locations of Interactions

School Y	Related to Course-work	Related to Personal-Social Matters	Related to Other Matters
Interactions Occurring in Classrooms, Seminar Rooms, & Labs (150=100%)	35%	40%	25%
Interactions Occurring in Halls, Stairs, & Lobbies (150=100%)	31%	44%	25%
Interactions Occurring in Other Locations, Including Library, Gym, Cafeteria, etc. (115=100%)	26%	50%	23%

The data show the highest percentage of informal interactions related to course-work occurs in the classrooms, seminar rooms, and labs. The definition of informal interactions is such that this percentage excludes the formal student-teacher interactions which are part of the regular instructional procedure and which comprise the bulk of classroom activity. Fewer informal interactions relating to course work occurred in the halls, stairs and lobbies, and still fewer in other locations. There is a corresponding increase in the percentage of personal-social interactions as one moves away from the classroom area. These data support the view that interactions taking place closer to the instructional setting are more likely to have an academic content.

Questionnaire Item #6 -- Activities Engaged In By Participants When Interaction Began

The information from this item is useful in understanding the behavioral context in which the interaction took place. To classify the kinds of activities in which students were engaged when informal conversations occurred, four main categories were used: (1) "Doing," which meant carrying out some specific stationary activity; (2) "Waiting," which meant waiting for an activity to begin; (3) "In Transit," which referred to activities in which a student was going to a specific destination; and (4) "Roaming," which referred to activities in which the student was moving about the building without having a specific destination in mind, although he was possibly seeking a certain kind of environment. Categories 1 and 2 refer essentially to stationary activities, while 3 and 4 refer to activities in which the individual

is going from one place to another. Another difference is that Categories 1 and 3 have a more clearly defined purpose than Categories 2 and 4. Since many conversations occurred while the students were eating lunch, the category "Eating" was added as a sub-category under "Doing."

It seemed likely that the number and length of interactions which students participated in while in transit might be influenced by the extent to which the school building was spread out and lacking in compactness, as a result of the extendedness of its layout and its long corridors. If an architectural factor like this can be shown to have such an effect, then, as more is learned about the types of informal student interactions which occur in transit and their desirability, it may be that architects ultimately will be able to influence their occurrence by modifying the architectural design of school buildings. The distribution of the data for each school is shown in the following table:

Table 12

Activities Engaged in by Participants When Interactions Began

Interactions	In Transit	Roaming	Waiting	Doing	Eating
School X (289=100%)	30%	2%	23%	38%	6%
School Y (285=100%)	37%	1%	26%	30%	6%
School Z (264=100%)	33%	2%	23%	36%	6%

School Y has the largest percentage of "In Transit" interactions, ost likely due to the extended layout of this school.

The number of conversations recorded for an activity category is, f course, in part related to how much of the academic day is spent in ctivities falling into that category. However, it is clear that some ctivities which may take only a small proportion of the day may be ssociated with a disproportionnately high number of conversations, erhaps as a result of supplying an especially favorable interactional etting or increasing the probability of encountering individuals with hom interaction is desired. It seems reasonable that the character- stics of interactions may differ according to the accompanying activi- ty which in part provides their behavioral setting; in turn, the nature of the activity is often in part determined by the location in the building where it occurs. For example, certain activities, such as working in a lab, may tend to encourage fairly frequent but short conversations, while other activities, such as eating, tend to encourage a smaller number of conversations which, however, are longer and more sustained. Thus it is seen that in addition to influencing frequency, the nature of the activity and its setting may affect the length of conversations. Length of the interaction obviously has some effect on the kind of topic which is likely to be discussed, and the depth or extensiveness with which it can be treated in the conversation.

It has previously been commented upon that at School Y, there is a pattern of a higher percentage of two-person interactions occurring while students are in transit in the halls and stairs. To describe the "In Transit" interactions further, the length of time of "In Transit"

interactions was compared with that of "Waiting" and "Doing" interactions, analyzing the data for School Y as shown in Table 13:

Table 13

Comparison of Length of Interactions and Activities Engaged in By Participants When Interactions Began

	Length of Interaction:			
	Up to 2 Minutes	3 - 4 Minutes	5 - 10 Minutes	Over 10 Minutes
Activity Categories at School Y				
"In Transit" Interactions (102=100%)	59%	29%	10%	2%
"Waiting" and "Doing" Interactions (154=100%)	45%	28%	19%	8%

As expected, the majority of the "In Transit" interactions have a short duration of two minutes or less, while interactions accompanying activities in the "Waiting" and "Doing" categories take longer. This indicates that "In Transit" interactions are typically characterized by haste and brevity which place certain constraints on the content, both in terms of the kinds of topics which can be discussed and what can be said about them in a limited amount of time.

Questionnaire Item #7 -- Activities Engaged in By Other Participants When Interaction Began

Originally it was planned to study the specific routes used and the activities engaged in by all participants in a particular interaction, that led to that interaction's taking place. Later this approach was viewed as being too ambitious for the present study, and this item was not scored.

Questionnaire Item #8 -- How Student Took Part in Interaction

It was conjectured that the extent to which a student perceived himself as participating in a conversation might give some indication of his involvement in the interaction. Therefore, it was decided to collect and compare the perceptions of students about the extent of their participation in their interactions. It was recognized that the data might be somewhat distorted and that self-reports on this question could be factually inaccurate, since students might not realize how much or how little they were actually participating. Nonetheless, the data appeared potentially interesting enough to warrant scrutiny. The following data for the 11th grade show there were practically no differences among the schools on this item:

Table 14

Extent of Self-Perceived Participation in Interactions

Interactions	Talked a Lot	Talked Some	Listened Mostly
School X (289=100%)	24%	56%	19%
School Y (285=100%)	27%	56%	17%
School Z (264=100%)	23%	61%	16%

It seemed interesting also to examine the relationship between the student's perceived extent of participation and the size of the interaction group, since group size appears to be a variable that can be influenced by the architecture, and, when considered with other factors, the extent of participation may give one kind of indication

of the quality of the interaction. Table 15 examines the data for School X in terms of the relationship between these two variables:

Table 15

Extent of Self-Perceived Participation in Interactions Compared with Size of Group

	Extent of Participation: Talked a Lot	Talked Some	Listened Mostly
Interactions at School X			
Two Participants (146=100%)	25%	57%	18%
Five or More Participants (42=100%)	24%	50%	26%

There is virtually no difference between "Talked a Lot" percentages, alghough there are slight differences in the "Talked Some" and "Listened Mostly" categories. It may be that most students actually do view themselves as talking some, rather than talking a lot, in the majority of their interactions. Or, on the other hand, a possible explanation may be that students viewed the "Talked a Lot" answer-choice as descriptive of the behavior of a "big-mouth" which, particularly among teenagers, is likely to have given that choice an unfavorable connotation in terms of desirable social behavior. Further data would be required to clarify the meaning of the above differences about the extent of participation in interactions. It is interesting, however, to note that in the larger interaction-groups more students reported themselves as listening mostly, as would be expected.

Questionnaire Item #9 -- Content of Interaction

Although rather limited as a measure of the quality and possible academic desirability of an interaction, the content of an interaction

constituted the major kind of data in this study used for evaluation of the quality of the interaction. The general criterion decided upon was that the interactions with academically-related or school-related content are generally more desirable in promoting informal academic learning than those which do not have academic or school-related content. In evaluating the possible desirability of the various kinds of school-related interactions, content dealing with coursework or homework was ranked as most desirable; with school events, extra-curricular activities and future plans ranked second; and content dealing with teachers or the school administration ranked third. Content dealing with social and personal matters was viewed as being less likely to contribute to the informal academic learning process, and it was thus ranked as least desirable, although such content certainly contributes to the learning in a broader sense.

These criteria have limitations and ignore a number of factors which may be very important. However, the criteria are useful in providing a preliminary way of sorting the data about interaction content, which represents an initial attempt to evaluate the quality of various types of interactions. One limitation is that the quality, or desirability, of a type of interaction should not really be considered apart from the educational situation to which it relates, and the educational objectives of that situation. Furthermore, it was recognized that the categories and rankings used are somewhat conjectural and arbitrary, and in addition represent oversimplifications. A further limitation is that these categories deal with interactions only in terms of their manifest content, ignoring latent content, and ignoring issues both of the possible complex relationship between different types of interactions, and the possible array of important interactional needs that

students might have to satisfy in their interactions, in order to accomplish effective informal academic learning.

For example, it is easy to see that students are unlikely to engage in informal academic interactions with other students whom they know only slightly, or with whom they are not on comfortable social terms. Thus, interactions about social and personal matters may cumulatively help set the stage for interactions resulting in informal academic learning. In addition, students may need to react to various events of the day which have personal or emotional significance before they can turn to topics that are academically related. In this respect, the student is not too different from the worker in a business office, who as part of the process of getting assigned tasks done, has social-emotional needs which must be attended to and satisfied. Thus in order to accomplish the work, the individual may find it necessary to talk with his peers who share the same situation, discussing what the "boss" really meant by a certain set of instructions, "ventilating" feelings by expressing gripes about aggravating aspects of the work situation, and offsetting the hard effort or monotony of the task by some recreation, which may consist of having periodic enjoyable "talk-breaks" with fellow workers. Clearly even interactions dealing with gripes, or with social and personal matters, may be of value and be a desirable part of the day, as long as these are functional in that they facilitate getting the work done properly.

In filling out the questionnaire, students were instructed that they could list up to three topics or contents for an interaction; in the case of more topics than three they were to list the three which were

most talked about in the conversation. These contents were then categorized. The data are shown for the three schools in the following table:

Table 16

Content of Interactions

	Academically Related				Non-Academ. Related	Unknown
	Course Work	School Events	Future Plans	Teachers, School Admin.	Personal-Social	
Interactions						
School X (385=100%)	22%	15%	2%	6%	53%	1%
School Y (415=100%)	31%	12%	3%	7%	44%	2%
School Z (357=100%)	30%	13%	1%	10%	44%	3%

Note: In this table it will be noticed that the numbers of interactions given are higher than in the other tables. The reason is that multiple-content interactions in which several topics were discussed were categorized in terms of each of their various contents, for purposes of analysis. Thus the number of content-categories exceeds the number of interactions, since each of the content-categories was counted up to a maximum of three per interaction.

In view of the criticisms heard about students spending too much time discussing personal and social matters in school, it is interesting to note that in two schools, the percentage for this kind of interaction constitutes less than half of the total and, in the other school only slightly over half of the total. It is thus seen that a large portion of the informal conversations are related to school activities. The differences found in comparing the three schools must be interpreted cautiously. The data represent only interactions for one

day, on which there could have been important events connected with course-work which might give a somewhat higher percentage for one school than is typical for an average day. For example, report cards had been given out at School Y the day before, with resulting discussion of this topic. An analysis of the content of course work interactions at School Y confirmed this point, by showing that 37% of these dealt with "school grades" or "report cards."

Another important point about course work interactions pertains to the distinction between those which are about assignment of course work, such as the number of pages required to be read or how long the homework took; opposed to those of a more academic type, such as discussion of ideas presented in the class or textbook. The questionnaire did not collect information about the content of "course work" interactions in such a way that a distinction would be made between these two types, but interview data indicated that many of these interactions dealt with the assignment of course work rather than its intellectual content.

Nonetheless, interactions dealing with the assignment of course work may make a more important contribution than is realized at first. In a number of these interactions, students compared their performances in studying, or in completing an assignment. While, on the surface, such content might appear to make relatively little contribution to informal academic learning, further data provided by students in the interviews suggested that comparing performance may in fact have the important function of "setting the pace" by establishing performance norms, and therefore may have an important effect on motivation and

achievement. Whether the performance norms for a subgroup of students are set high or low depends on many factors in the school, as well as on the subgroup to which a student belongs. But certainly the communication of these performance norms, together with information on the efforts actually made by students, would seem to be an important factor in learning.

Considering the kinds of interactional situations which are conducive to course work interactions, one may first note the distribution of interactions in terms of dealing with a single topic or several topics, shown in Table 17:

Table 17

Single-Content Compared with Multiple-Content Interactions

	Single-Content	Multiple-Content
Interactions		
School X (289=100%)	78%	22%
School Y (285=100%)	68%	31%
School Z (264=100%)	72%	28%

As can be seen in this table, the majority of the interactions reported deal with a single topic, and differences are slight among the three schools.

The following table now examines the data for School Z, comparing the subject matter of single-content and multiple-content interactions, in order to find out in which of these types of interactions course work is discussed more often:

Table 18

Subject Matter of Single-Content and Multiple-Content Interactions

	Content of Interactions: Course Work	Other School-Related	Personal, Social
Interactions at School Z			
Single-Content (189=100%)	21%	28%	50%
Multiple-Content (75=100%)	39%	26%	35%

The data show that course work is discussed more often in multiple-content interactions than in single-content interactions.

Therefore, it next seems worthwhile to analyze multiple-content interactions further to find out what percentage of these were related entirely or partly to coursework:

Table 19

Course Work Content of Multiple-Content Interactions

	Total Multiple-Content Interactions	Multiple-Content Related Entirely to Course Work	Multiple-Content Related Partly to Course Work	Multiple-Content Entirely Unrelated to Course Work
Interactions				
School X (289=100%)	22%	2%	12%	8%
School Y (285=100%)	31%	5%	15%	11%
School Z (264=100%)	28%	7%	14%	7%

The main point of interest here is that multiple-content interactions are quite rich in content related to course work. Thus, personal-social conversations may have embedded in them some discussion of course work, and consequently, it should not be assumed that such conversations make no contribution to informal academic learning. In short, discussions of personal or social matters may be useful academically when these provide a contextual matrix in which academically related interactions occur.

In considering what conditions encourage multiple-content interactions, it would be expected that interactions covering several topics generally would require more time. This is confirmed in the following table, which shows the length of time of single and multiple-content interactions, analyzing the data for School Z:

Table 20

Comparison of Length of Interactions and Single-Content and Multiple-Content Interactions

	Length of Interaction:			
	Up to 2 Mins.	3 to 4 Mins.	5 to 10 Mins.	Over 10 Mins.
Type of Interaction at School Z				
Single-Content (189=100%)	55%	29%	13%	3%
Multiple-Content (75 = 100%)	21%	11%	52%	16%

It will be recalled that longer interactions tended to occur while students were engaged in activities in the "Waiting" and "Doing" categories, and shorter interactions tended to occur while they were engaged in "In Transit" activities. While data are lacking

to give a full description of the characteristics of longer interactions, the data collected suggest that interactions occurring while students are relatively stationary, either "Waiting" or "Doing," combine with the two variables of multiple-content and a length of over five minutes to form an identifiable type of interaction. As has already been shown, this type of lengthy interaction -- which typically occurs with groups of students in the halls between class periods, often to the annoyance of the school administration -- can at times be highly desirable due to the contribution it makes to informal academic learning.

It might be inferred that the interest and emotional involvement of students in various kinds of topics might be shown indirectly by how they evaluated the adequacy of the amount of time available for discussing certain topics. Therefore, the table on the following page, comparing the data for Schools Y and Z, was used to examine how involved students are in discussing course work, as compared with personal-social matters.

However, if the inference is correct that involvement in topics is indicated by how the adequacy of time is rated, then, after examining the data in the table, one finds that there is relatively little difference in the extent of involvement, either when the schools are compared, or when the different types of topics are compared.

The only difference between Schools Y and Z is that School Z shows a somewhat higher percentage of "All Other Academically Related Topics" as being partially or very rushed, and this may suggest a somewhat higher degree of involvement and need to talk about these kinds of topics. Interactions in this category include those pertaining to school events, students' future plans, and the actions of teachers or the school administration.

Table 21

Comparison of Amount of Time and Content of Interactions

Content of Interactions	Adequacy of Amount of Time: Enough Time	Adequacy of Amount of Time: Partially Rushed or Very Rushed
School Y		
Course Work (129=100%)	71%	29%
All Other Academically Related Topics (102=100%)	63%	37%
Personal-Social Matters (184=100%)	60%	40%
School Z		
Course Work (107=100%)	69%	31%
All Other Academically Related Topics (85=100%)	50%	50%
Personal-Social Matters (157=100%)	65%	35%

Questionnaire Item #10 -- Main Purpose of Interaction

In this questionnaire item, the student was asked to state what for him or her was the main purpose served by each interaction. Some of the possible answer-choices given in the left margin of the questionnaire were to: "give information," "get information," "express

opinions," "be friendly," "gripe," "kill time," " have an interesting talk," or "exchange ideas." The reason for including this item was to collect data about the purposes or motives served by student informal interactions, both: (1) to learn more about the reasons why interactions occurred, and the basic student needs satisfied by such interactions; and (2) to find out what are some of the different ways in which the purpose of an interaction may be related to its content. In addition, the data collected by this item made it possible to obtain a little more information about the content of particular interactions, for when the information about an interaction's content (e.g. "the homework assignment") and the interaction's purpose (e.g. "to gripe") are put together, considerably more about the content is learned.

At the time the questionnaire was designed, it was anticipated that a certain specific kind of interactional content -- for example, discussion about a particular homework assignment -- might serve a number of different purposes for the participants in the interaction, depending on the situation. This assumption was supported by the data; for example, it was found that an interaction pertaining to a homework assignment might in one situation serve the purpose of getting information, while in other situations it might serve the purpose of being friendly, or of griping, or of killing time. Furthermore, the purposes served by a particular interaction might be different for each of the participants.

In the analysis of the purposes served by interactions, the purposes have been categorized along lines traditional in social

psychology, with the one main category representing an informational component, and the other main category representing a social or emotional component. The data about purposes of interactions for the 11th grade students are compared in Table 22:

Table 22

Purposes of Interactions

Interactions	Mainly Informational	Mainly Social-Emotional	Both	Unknown
School X (289=100%)	56%	33%	10%	-
School Y (285=100%)	51%	35%	11%	2%
School Z (264=100%)	50%	43%	6%	1%

One difference noted in this table is that School X, which actively strives to encourage students to learn independently, has a slightly higher percentage of interactions which serve mainly informational purposes. Another difference is that School Z has the highest percentage of interactions that are mainly social-emotional in purpose, and the smallest percentage that serve both informational and social-emotional purposes. It is only possible to speculate on the reasons for this difference. In the interviews, the students from School Z -- which is the small private city school studied in this research -- referred many times to the high intellectual standards of the school and the pressure that most of the students felt was placed on them to perform at their top capabilities. As a result of the

selective admission policies of School Z, the student body is certainly the most homogeneous of the three high schools in intellectual values and goals. The investigators felt it was likely that the standards were particularly high there, and responded to quite uniformly by most of the students. It might be speculated that in this kind of academic environment there is a greater need for interactions which satisfy social-emotional purposes, and a tendency to react to or to relieve the pressure by expressing feelings and having recreational "talk-breaks."

In thinking about various types of interactions which are likely to have a large informational component, it might be expected that course work interactions would have almost entirely informational purposes. However, when the data for course work interactions at School Z are analyzed in terms of the two basic categories of purposes, the following distribution is found:

Table 23

Purposes of Course Work Interactions

	Mainly Informational	Mainly Social-Emotional	Both	Unknown
Course Work Interactions at School Z (107=100%)	50%	38%	9%	2%

This table reveals an interesting fact about the purposes which academically-related interactions may serve. Based on the finding that only 50% of the course work interactions are described as serving mainly informational purposes, it can be said that both acquisition of

information and socializing seem to occur in course work interactions, and sometimes at the same time. Furthermore, in some cases, interactions about course work can satisfy informational and social needs simultaneously, and thus at times the two may be confounded and difficult to sort out.

Perhaps, this aspect of the multiplicity of purposes served by interactions ostensibly dealing with a certain topic should be discussed further here, so the implications for informal learning emerge more clearly. An example is a student's inquiry to a fellow student, asking what he thought of the material presented in the reading assignment for a history course. The question can be responded to by another student at various content-levels of richness and seriousness, from an answer of "too long" to an answer which discusses the ideas presented in the reading. But, regardless of the content-level, both the inquiry and the answer can serve either the purpose of collecting useful information, and/or the purpose of expressing a sociable interest in another student's activities and feelings. In the one case, the informational purpose may be primary, with sociability being a by-product; while in the other case sociable purposes may be primary, with collection of academically-related information occurring as the incidental by-product. But in <u>each</u> case, there is an opportunity for informal learning to take place. It becomes increasingly clear that the categorization of contents and purposes of interactions, and the evaluation of the quality of interactions, are in fact complex matters, even though we have been forced initially to treat these matters quite simply.

Data about the purposes of student interactions could be viewed as providing a further basis for assessing the quality or desirability of

various types of interactions. But, while it might seem initially reasonable to set a criterion in which informational purposes are the most desirable, combined informational and social-emotional next most desirable, and social-emotional least desirable, it has already been pointed out that the matter is more complex than this, since, for example, interactions which have a social-emotional content often include discussions of course work. Thus this criterion is too simplistic; and the data presented here are offered mainly for their general interest, and to furnish a starting point for future considerations of how to approach the criterion question, in assessing the desirability of certain types of student informal interactions in furthering informal learning.

Keeping the limitations of the data in mind, one can next examine the locations where interactions occurred in the school building, considering the percentage of interactions serving informational or social-emotional purposes which took place in each of a number of different locations at School Y. Table 24 on the following page shows the results.

In looking at the percentages for School Y, one finds that the trend is for at least 50% of the interactions in nearly every location to have "mainly informational" purposes. However, the data for the gym and "other locations" should be discounted because of its being based on too few interactions, which may explain the rather unbalanced-looking figures of 80% and 100% when these are compared with the other percentages. The percentage for the library is derived also from a somewhat small number of interactions, so it may not be representative. If the library percentage is accepted, however, one can only speculate on the reasons for most of the interactions' having a social-emotional purpose.

Table 24

Comparisons of Purposes of Interactions with Locations

	Purposes: Mainly Informational	Mainly Social-Emotional
Locations of Interactions In School Y		
Outside (12=100%)	50%	50%
Halls, Stairs, Lobbies (96=100%)	52%	48%
Classrooms, Seminar Rooms, Labs (121=100%)	58%	42%
Library (15=100%)	27%	73%
Gym (5=100%)	80%	20%
Cafeteria (31=100%)	55%	45%
Other Locations (4=100%)	100%	-

One reason might be that the atmosphere of quiet and studiousness characteristic of a library causes students to react with an especially high proportion of social-emotional interactions when they take a conversational break.[1]

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1. The extent to which talking was restricted in the library varied among the three schools, but in all cases the library could be viewed as a more permissive and less punitive setting than the teacher-regulated classrooms, though the library certainly ranked as a more restricted behavioral setting than the hallways. In contrast with the classrooms the library was more attractive physically, and students could generally have more free-choice in the activities they worked on there, and could also talk periodically with less restraint being placed on them. Information obtained in interviews showed that the freer

Questionnaire Item #11 -- Whether Purpose Was Accomplished

This item, like Questionnaire Items 9 and 10, was included in the hopes it would provide a kind of measure of the quality of the interactions. In addition, it was thought that this item, together with Item 13, would give an indication of whether students felt satisfied, or dissatisfied and frustrated, in their attempts to conduct informal interactions. The data for the 11th grade of all three schools are shown in the following table:

Table 25

Accomplishment of Purpose of Interactions

Interactions	Yes	No	Partly
School X (289=100%)	82%	5%	12%
School Y (285=100%)	77%	7%	16%
School Z (264=100%)	77%	6%	17%

The finding -- that with roughly three-fourths of the interactions, students answered affirmatively that their purpose in having the interaction was accomplished -- suggests that the item, as it was worded, may not have great discriminatory power. Another possibility is that the students are relatively satisfied with their achievement of the purposes of their interactions, in spite of the fact that a substantial number of their interactions are short and hurried.

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1. (cont.) atmosphere motivated students to come to the library, because of the more relaxed and pleasant setting, and the opportunity for some socializing. The freer atmosphere of the libraries may be good educatinnal strategy if the intent is to create an educational setting that is enjoyable and thus more favorably perceived by students.

Questionnaire Item #12 -- Approximate Amount of Time Interaction Took

The reason for this item was to find out what was the typical length of the students' interactions. It was realized that -- as with the questionnaire item relating to extent of participation -- it might be difficult for students to note the exact amount of time their interactions took. So the reader should view the data about interaction lengths as representing subjective time-estimates rather than objectively timed durations. On the other hand, it should be pointed out that the school schedule, bell system, and abundance of clocks, give many students a keen awareness of time.

Table 26

Length of Interactions

Interactions	Up to 2 Minutes	3 - 4 Minutes	5 - 10 Minutes	Over 10 Minutes	Unknown
School X (289=100%)	36%	25%	31%	10%	-
School Y (285=100%)	49%	24%	15%	6%	1%
School Z (264=100%)	49%	26%	19%	4%	1%

The major finding here is that for all three schools a substantial percentage of interactions -- approximately one-third to one-half of all interactions -- are perceived by the students as being quite short and lasting two minutes or less. However, a difference among the three schools on the percentages is that at School X there are considerably higher percentages of interactions falling in the "5 - 10

Minutes" and "Over 10 Minutes" categories, and a considerably smaller percentage falling into the "Up to 2 Minutes" category.

This difference can be explained in two ways. First, the administrative control of the students was very distinctly the freest and most permissive at School X, where a democratic management theory prevailed, with the goal of encouraging the students to develop their own motivation and self-control. Students were allowed to gather and talk freely in the halls, even during class periods. Also, there were no bells which signalled the beginning and end of class periods, and a generally liberal attitude was taken by teachers toward students who made leisurely arrivals in class. Therefore the administrative attitude in School X would appear to encourage lengthier interactions.

Second, the architectural layout of School X, which was the most innovative of the three schools, was characterized by a corridor system in which there was an especially large number of intersections where major arteries of traffic crossed. In addition, at these intersections there was an especially ample hallway width which provided space for large groups of students to congregate, unhampered by the traffic flow. Clearly it is difficult to sort out which of these factors -- the administrative attitude or the architectural layout of the corridor system -- may have been the more influential in creating a behavioral setting in which students tended to hold long conversations.

Questionnaire Item #13 -- Whether There Was Enough Time for Interaction

The main reason for including Item #13 was to compare the students' perception of whether there was an adequate amount of time for the

interaction, with the accomplishment of the interaction's purpose. The cross-tabulation, using data for School X, follows:

Table 27

Accomplishment of Purpose Compared With Adequacy of Amount of Time for Interactions

	Accomplishment of Purpose: Yes	No	Partly
Adequacy of Time For Interactions at School X			
Enough Time (196=100%)	84%	4%	12%
Partly Rushed (68=100%)	71%	7%	22%
Very Rushed (19=100%)	95%	5%	0

Based on these figures it can be said that the adequacy of the time available for the interactions appears to make some difference in whether the purpose of the interaction is accomplished, but not much. This finding leads to the conclusion that students tailor the content and purpose of their interactions to the amount of time they have available, thereby achieving their purpose. In support of this conclusion it is interesting to note that with the "Very Rushed" interactions, there is the highest percentage of interactions in which the purpose was accomplished, and no "middle-ground" of instances in which the purpose was partly accomplished. Therefore, it seems reasonable to infer that students are tailoring interaction content to the amount of time available, so that these rushed interactions have very limited clear-cut objectives which can easily be accomplished.

It is interesting also to compare the estimated lengths of interactions with students' perceptions of whether there was an adequate amount of time for interactions. This cross-tabulation, using data for School Z, follows:

Table 28

Length of Interactions Compared
With Adequacy of Amount of Time

	Length of Interactions:			
	Up to 2 Minutes	3 - 4 Minutes	5 - 10 Minutes	Over 10 Minutes
Adequacy of Amount of Time for Interactions at School Z				
Enough Time (170=100%)	47%	26%	21%	6%
Partly Rushed (86=100%)	45%	26%	14%	15%
Very Rushed (19=100%)	53%	32%	15%	-

It is striking that for the "Up to 2 Minutes" and "3 - 4 Minutes" interactions, the factors of adequacy of amount of time and length of interaction are independent of each other; and even for the "5 - 10 Minutes" and "Over 10 Minutes" interactions they are relatively independent. This shows that although both these measures represent personal time estimates, there is little overlap between how students perceive the length of the interaction and how they perceive the adequacy of time. The finding has two implications. First, that students can indeed distinguish between the two factors. Second, that adequacy of time for an interaction is not accounted for simply by the number of minutes an interaction took, but requires the inclusion of additional

factors for a satisfactory explanation. One of these additional factors is very likely the content of the interaction, for without a doubt, some contents require a larger amount of time for adequate discussion that do others.

CONCEPTS EMERGING FROM THE STUDY

1. Symbolic Ownership of Spaces -- If one wishes to recognize a symbolic "ownership" of the various spaces which comprise a high school building, then it may be generally said that the classrooms, labs, seminar rooms and teachers' lounge and offices mainly belong to the faculty; the principal's office and adjacent hall, and the auditorium belong mainly to the administrative staff; and the halls, stairs, student restrooms, cafeteria, and outside area surrounding the school building belong mainly to the students. Ownership of spaces seems to be related to the amount of behavioral freedom or restriction which students feel exists in that space. Ownership also seems to have some influence on the students' thinking when they are considering appropriate locations for certain kinds of informal interactions. While the ownership of spaces is functionally and administratively determined, it becomes architecturally connected. Since ownership is related to the amount of control which students perceive existing, architects through design modifications could somewhat alter the ownership of spaces in the school, if this were found to be educationally desirable.

2. Psychological Centers -- The investigators found, as a result of observing activity in the halls at different times of the school day, that students congregated between class periods at certain places in the halls, which served as gathering places for large groups of students. The term "psychological center" has been selected to describe such a gathering place. The locations of psychological centers are difficult to predict simply by the architectural layout of a school building, although once one sees where they are, they make good sense.

Characteristically, psychological centers are located at the intersection of two or more main halls or stairs where there is a high volume of traffic between periods. They are also often located where there is a wide space for a large group to congregate, and near a part of the school which is important to the students and where there is not excessive faculty monitoring. For example, in School X an important psychological center existed near the actively used and centrally located library; while in School Z an important center was located near the administrative offices. The locations of psychological centers may be constant, or may shift during the day, depending on the time of day and the students' schedules, and depending in part upon changes in where the largest volume of traffic occurs.

In the high schools studied, there was typically one main psychological center, as well as one or two smaller centers, in existence at any one time during the day between class periods. The subsidiary centers were distant from the main center, thus serving a need for students who could not get to the main psychological center. In these centers, many of the students' conversations took place -- including naturally the majority of the large-group conversations. The interview data made it clear that a psychological center served the function of a communications nerve-center for exchanging up-to-date academic or social messages and news bulletins consequently many students purposely planned their routes so as to "check through" the center at least several times a day. Here students would find out such things as how hard was the geometry test being given that day, or whether the English teacher had really meant it about having expected the students to read all of the

homework assignment. The function of a psychological center explains why its location strikes a compromise between being at a main"highway" intersection, and giving the students some privacy from the teachers and administrative staff, as well as being relatively near to an important place, such as the main office, whichis a headquarters from where actions and information of interest often originate.

3. Student Social Schedules -- It was found that in additior to the class schedule whichstudents were obligated to follow, there is also a social schedule which many students follow. The social schedule is generally established with considerable planning and from day to day shows a surprising amount of regularity. In fact, for a substantial number of students the social schedule is more important than the class schedule, for it determines when and where they will meet other students throughout the day. The social schedule influences to a considerable degree the routes a student will select in going from one class to another, and the timing of his arrival at various locations in the building. Interview data showed that students frequently made detours for the sake of their social schedules, which might include such activities as walking a friend to another class, or dropping in to exchange messages at one of the psychological centers. The concepts of "psychological centers" and "social schedules" give an enriched understanding of how the informal interactions of students take place. The value of an awareness of the social schedule is that it often gives a more accurate picture of how students move about the building than does the class schedule.

4. Mix -- The term "mix" is used to refer to the extent that students have contact with students of the opposite sex, or of different

class-levels, or of different educational programs. What represents a desirable mix depends in part upon the goals to be attained. The question of what constitutes a desirable mix has been recently debated in a number of city school systems, in connection with the grouping of students by race or ability. More research is needed to ascertain how heterogeneous or homogeneous a mix of students should be, for effective learning to occur in accordance with various goals and circumstances. But it appears that in a more heterogeneous mix an enriched social environment is created, in which a greater variety of informal learning is possible, and in which students are more likely to be exposed to the exchange of divergent views. On the other hand, successful interactions require a mutual satisfaction of needs, and if the mix is too heterogeneous students may have so little in common that it is difficult for interactions to occur.

Architects and administrators, without being particularly aware of it, often create homogeneous mixes. This occurs when in the interests of efficienty, or cutting down on noise and disruption, similar activities are located adjacent to each other -- as for example when all related offices, or departments, or classes of one grade-level are located in the same wing of a building. A common illustration is that in many high schools the vocational education facilities are located in a separate wing from the academic facilities. The result is to decrease interactions between the academically and vocationally oriented students to an extent even greater than would otherwise occur. This is not to say that a very homogeneous mix may not be ideal for certain educational goals, but simply to urge that school architects and administrators become more aware of the probable effects of various mixes upon learning.

A good heterogeneous mix does not consist simply of mixing all the departments together without any awareness of the costs and benefits to a particular school. If there are substantial advantages to the faculty in keeping the departments intact, for example, by locating all the physics classrooms and labs together, then a good mix might still be achieved by placing the physics department next to the vocational education facilities, or next to the art department.

The curtailment of variety in interactions caused by a restricted mix can have undesirable cognitive and motivational effects. By narrowing the exposure and choices for the student, his educational experience is also narrowed, for he sees and hears about only those specific subjects in which he and his classmates are taking courses. He hears little about other courses he might have chosen, or courses he might select in subsequent years. One result of this is that he may find it more difficult to consider educational alternatives and clarify future occupational goals.

5. Cohesive vs. Isolating Buildings -- This architectural-behavioral concept refers to whether the building in general promotes or hinders interactions, and thus it is helpful in understanding how design factors can influence the occurrence of interactions. The cohesive building makes it easier to have interactions and so promotes cohesion among the users. A cohesive building differs from an isolating building in that it is generally characterized by a compact layout; clearly defined central areas where students may congregate together between classes; relatively few alternate routes; teachers' offices placed on routes that students frequently take; the principal's office centrally located,

possibly near a major building entrance or route used by the students; and a relatively heterogeneous mix of departments. By contrast, isolating buildings tend to have an extended layout with long corridors, and to provide many alternative routes for students to follow in changing classes. A building organized around a large courtyard is likely to be isolating, if the courtyards are spaces around which students must detour. Cohesive buildings facilitate interactions with comparatively large groups of students taking part; while isolating buildings facilitate smaller group interactions. One may speculate that larger groups are more apt to have conversations less in keeping with the goals of the school administration. Thus it is likely that the layout of a school building has some influence on student motivations.

SUMMARY

Based on the study of three high schools and a stratified sample of 300 students, the main findings -- that emerged from the written questionnaire and interviews -- provide the following information about informal student interactions and related school building design factors:

- First, informal conversation among students, and students and teachers, can play either a positive or negative role in influencing motivation and attitudes, in affecting the learning process, in creating cohesion among students, and in altering the gap between the value systems of the "teacher culture" and "student culture."
- Second, 50% of informal conversations are academically-related; that is, 27% deal with course work, 7% deal with teacher relationships, 13% deal with school events, and 3% with college and future plans. The remaining 50% deal with personal-social matters.
- Third, one out of every four interactions deals with several topics, and of these, over half include some mention of course work. Thus academic content is often embedded in personal-social conversations.
- Fourth, although 33% of all conversations were rated as "rushed," nearly 80% were rated as having fulfilled their purpose. These findings suggest that students for the most part succeed in "tailoring" the content and purpose of their inter-

actions to the amount of time that is available.

Fifth, there are some indications that the layout of the school building affects the size of student groups which, in turn, affects the content of student conversations. Central, or cohesive layouts, which facilitate larger groups being formed, seem to promote student conversations that are less in keeping with the goals of the school administration. On the other hand, extended or isolating layouts require students to spend more time traveling from one classroom to the next, with the result that smaller groups are formed. These smaller groups seem to have conversations that are more in keeping with the goals of the administration.

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*** Note: The asterisked readings are those which are specifically referred to in this report.**

APPENDIX A

HIGH SCHOOL INTERACTION INVENTORY

Note: This questionnaire was used to collect written self-report information about the students' interactions and the locations in the high schools where these occurred. It was called an "Inventory" rather than a "Questionnaire," because school systems find the latter word sometimes has unfavorable connotations. In its complete format, the "High School Interaction Inventory" consisted of: (1) a cover sheet on which the student entered certain biographical data, giving his or her name, school, grade-level, age, sex, class period and date during which the questionnaire was filled out, complete daily schedule of classes, and extra-curricular activities; (2) detailed instructions for filling out the interaction recording sheets, with the instructions being read over aloud with the students; (3) a sample interaction recording sheet with illustrative answers filled in; (4) five blank interaction recording sheets, providing the necessary recording space for a total of fifteen interactions, with instructions to ask for more recording sheets if needed; and (5) a final sheet containing several optional questions about school building design, which students were to answer if they finished recording their interactions before the rest of the class did. (The main purpose of the sheet with optional questions was to keep students occupied throughout the period, so if they finished early they would not make distracting noises, or have an opportunity to work on their homework, with the possible result that students with more interactions might have been motivated to cut short their recording in order also to gain a bonus of some extra "study-hall" time.)

As the questionnaire in its complete format is quite lengthy, only its most important part, the "Interaction Recording Sheet," has been reproduced for inclusion in the appendix. To make the use of the sheet clearer for the reader, sample answers have been filled in. Each informal interaction is recorded downwards, in the columns that run from the top to the bottom of the page. Thus Column 1 contains one interaction, Column 2 contains another, and Column 3 gives a third interaction, allowing a total of three interactions to be recorded on each page.

Students were told to use, whenever appropriate, the answer-choices given in the left-hand margin of each recording sheet; otherwise to make up their own answers to fit the interactions being recorded. On Item #9 dealing with the content of the interactions, students were instructed that if the conversation dealt with several topics to list them all, unless these exceeded three in number, and in that case to list the three topics which received the most discussion. It was explained that students did not have to give any details about the content unless they wished to. Many students however, freely went into some detail about the content of their conversations, which was helpful to the investigators in providing more of an "in-depth" view of the content of high school student interactions.

For ease of use, each "Interaction Recording Sheet" was printed on a single sheet of legal-size paper. But, as this report will not accommodate a page of that length, the sheet has been split and printed for inclusion here on the two following separate pages:

Name John Doe
School High School Y Period 1st

INTERACTION RECORDING SHEET

	Column 1	Column 2	Column 3
1. Time when interaction occurred? State whether between class periods, or during period, e.g. "Between _____ period and _____," or "During _____"	before school started	between home-room and 1st period class	during first period
2. Total number of participants? Count yourself.	2	5	3
3. Who were the other participants? State whether teacher or student, and sex of persons. Give student's class level (Junior or Senior), if can.	Jr. girl	1 male teacher 2 Sr. girls 1 Jr. boy	1 Sr. boy & 1 Sr. girl
4. Who started interaction? Yourself, other person, or don't know.	myself	don't know	Sr. boy
5. Location where occurred? In hallway near _____, intersection of hallway near _____, stairway near _____, hall-locker(give#), classroom(state period), lab, office, lounge, gym, rest-rooms, locker room, cafeteria, library, parking lot, other outside area of school grounds, etc.	outside area of school grounds	hallway near first period classroom	first period classroom
6. What were you doing when interaction began? Studying, eating, etc., or going from _____ to _____, or waiting for _____ (specify)	walking into bldg on way to locker	standing in hallway	waiting for teacher to begin class
7. What were other persons doing? (See Question #6)	talking outside door of building	standing in hallway also	also waiting
8. How you took part in interaction? State whether you "talked quite a lot," "talked some" or "listened mostly"	talked quite a lot	listened mostly	talked some

(see next page for the rest of the questionnaire items)

INTERACTION RECORDING SHEET
(continued)

	Column 1	Column 2	Column 3
9. Content related to? Social life, personal matters, classwork, homework, test, teachers, school administration, college or future plans, extra-curric. activities, school events, news events, weather, small talk, etc.	school event & social life -- the coming school dance, and whether she has a date for it	extra-curric.-- editorial policy for next issue of school paper	homework-- borrowing a pencil - & laboratory assignment for another class, whether we all finished
10. Your main purpose? Give information, get information, express opinion, be friendly, gripe, kill time, have interesting talk, exchange ideas, etc.	get information	just be friendly	express an opinion, & gripe
11. Was purpose accomplished? State "yes," "no," or "partly"	no	yes	partly
12. Approximate amount of time spent, in minutes?	2	3	4-5
13. Enough time to talk, or partly rushed, or very rushed?	partly rushed	very rushed	enough

APPENDIX B

FULL TABLES

QUESTION #1: "TIME WHEN INTERACTION OCCURRED?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Between Classes	During Classes	During Lunch	Before School	After School	Not Stated
		%	%	%	%	%	%
Grand Total	(1672=100%)	32	43	10	7	7	-
School X	(533=100%)	29	46	7	9	8	-
School Y	(602=100%)	34	44	8	7	7	-
School Z	(537=100%)	34	38	16	5	7	-
Grade Totals							
Tenth	(244=100%)	26	50	6	9	8	-
Eleventh	(838=100%)	33	40	12	7	8	-
Twelfth	(590=100%)	34	44	9	6	6	-
Total Males	(755=100%)	36	39	11	6	7	-
School X:	(245=100%)	30	46	6	9	8	-
Tenth	(117=100%)	27	52	3	9	8	-
Eleventh	(128=100%)	34	41	8	9	7	-
School Y:	(261=100%)	40	36	10	7	6	-
Eleventh	(123=100%)	36	37	15	6	6	-
Twelfth	(138=100%)	45	35	6	8	6	-
School Z:	(249=100%)	38	35	16	3	8	-
Eleventh	(124=100%)	44	30	17	2	7	-
Twelfth	(125=100%)	32	40	15	4	9	-
Total Females	(917=100%)	28	46	10	7	7	-
School X:	(288=100%)	28	46	9	8	8	-
Tenth	(127=100%)	26	47	10	9	7	-
Eleventh	(161=100%)	30	45	8	8	8	-
School Y:	(341=100%)	28	51	6	7	8	-
Eleventh	(162=100%)	28	42	9	9	11	-
Twelfth	(179=100%)	27	60	2	5	6	-
School Z:	(288=100%)	30	42	16	6	6	-
Eleventh	(140=100%)	26	42	17	8	6	-
Twelfth	(148=100%)	34	41	14	5	5	-

QUESTION #2: "TOTAL NUMBER OF PARTICIPANTS IN INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Two Persons	Three Persons	Four Persons	Five Persons	Over Five Persons	Not Stated
		%	%	%	%	%	%
Grand Total	(1672=100%)	64	21	7	3	4	-
School X	(533=100%)	54	24	9	5	7	-
School Y	(602=100%)	70	20	4	1	3	-
School Z	(537=100%)	67	18	9	2	3	-
Grade Totals							
Tenth	(244=100%)	55	24	11	4	5	-
Eleventh	(838=100%)	61	22	8	3	6	-
Twelfth	(590=100%)	72	18	5	2	2	-
Total Males	(755=100%)	64	20	7	2	5	-
School X:	(245=100%)	56	24	9	4	6	-
Tenth	(117=100%)	57	21	12	4	5	-
Eleventh	(128=100%)	55	26	6	5	8	-
School Y:	(261=100%)	68	21	5	1	6	-
Eleventh	(123=100%)	64	19	6	1	10	-
Twelfth	(138=100%)	71	23	4	1	1	-
School Z:	(249=100%)	70	16	8	2	3	-
Eleventh	(124=100%)	67	19	10	2	2	-
Twelfth	(125=100%)	73	13	6	3	4	-
Total Females	(917=100%)	63	22	8	3	4	-
School X:	(288=100%)	52	25	10	5	8	-
Tenth	(127=100%)	51	27	11	5	6	-
Eleventh	(161=100%)	53	23	9	5	9	-
School Y:	(341=100%)	73	20	4	2	2	-
Eleventh	(162=100%)	72	22	5	-	1	-
Twelfth	(179=100%)	74	18	3	3	2	-
School Z:	(288=100%)	64	21	10	2	3	-
Eleventh	(140=100%)	57	22	13	4	4	-
Twelfth	(148=100%)	72	20	6	-	2	-

QUESTION #3-A: "WHO WERE THE OTHER PARTICIPANTS IN THE INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Student(s)				
		Same Sex	Different Sex	Both Sexes	Teacher(s)	Not Stated
		%	%	%	%	%
Grand Total	(1672=100%)	54	22	11	11	1
School X	(533=100%)	56	16	13	12	2
School Y	(602=100%)	56	25	10	8	-
School Z	(537=100%)	50	25	10	14	-
Grade Totals						
Tenth	(244=100%)	65	12	10	10	2
Eleventh	(838=100%)	51	23	13	11	1
Twelfth	(590=100%)	52	26	9	13	-
Total Males	(755=100%)	54	22	10	12	2
School X:	(245=100%)	60	14	10	12	4
Tenth	(117=100%)	70	10	7	8	5
Eleventh	(128=100%)	50	17	13	16	4
School Y:	(261=100%)	54	25	12	8	-
Eleventh	(123=100%)	59	20	14	6	-
Twelfth	(138=100%)	50	30	9	10	-
School Z:	(249=100%)	48	27	10	14	1
Eleventh	(124=100%)	50	30	11	9	1
Twelfth	(125=100%)	46	24	8	20	2
Total Females	(917=100%)	53	22	12	11	-
School X:	(288=100%)	52	18	16	13	-
Tenth	(127=100%)	60	13	12	13	-
Eleventh	(161=100%)	43	24	19	13	-
School Y:	(341=100%)	56	26	9	8	-
Eleventh	(162=100%)	55	24	10	10	-
Twelfth	(179=100%)	58	28	8	6	-
School Z:	(288=100%)	52	22	12	13	-
Eleventh	(140=100%)	51	23	13	11	1
Twelfth	(148=100%)	52	22	10	15	-

QUESTION #3-B: "WERE OTHER PARTICIPANTS IN THE INTERACTION FROM THE SAME OR DIFFERENT CLASS-LEVEL?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1473 responses)

		Same Class	Different Classes	Mixed Classes	Not Stated
		%	%	%	%
Grand Total	(1473=100%)	72	17	8	2
School X	(464=100%)	68	15	10	5
School Y	(550=100%)	74	18	6	-
School Z	(459=100%)	74	18	6	2
Grade Totals					
Tenth	(218=100%)	60	16	12	10
Eleventh	(740=100%)	75	17	7	-
Twelfth	(515=100%)	74	18	6	1
Total Males	(663=100%)	72	18	6	3
School X:	(215=100%)	67	16	9	8
Tenth	(108=100%)	56	18	10	15
Eleventh	(107=100%)	78	14	8	-
School Y:	(237=100%)	75	20	4	-
Eleventh	(113=100%)	76	18	5	-
Twelfth	(124=100%)	74	23	3	-
School Z:	(211=100%)	76	19	4	1
Eleventh	(113=100%)	74	21	3	1
Twelfth	(98=100%)	77	17	5	1
Total Females	(810=100%)	72	16	10	2
School X:	(249=100%)	70	14	12	3
Tenth	(110=100%)	65	15	13	6
Eleventh	(139=100%)	75	13	11	-
School Y:	(313=100%)	74	17	9	-
Eleventh	(145=100%)	72	19	8	-
Twelfth	(168=100%)	75	15	10	-
School Z:	(248=100%)	72	17	8	2
Eleventh	(123=100%)	74	16	8	1
Twelfth	(125=100%)	70	18	8	4

Note: The number of responses for this item is less than that for other tables, because interactions with teachers are not counted in this distribution which deals with class level of the students.

QUESTION #5: "LOCATION WHERE INTERACTION OCCURRED?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Outside	Hall Stairs Lobby	Cafeteria Restrooms	Classroom Study hall Labs	Gym Locker Rooms	Library	Not Stated
		%	%	%	%	%	%	%
Grand Total	(1672=100%)	5	31	13	38	3	5	4
School X	(533=100%)	6	27	17	38	3	6	2
School Y	(602=100%)	5	34	11	39	3	2	5
School Z	(537=100%)	5	32	12	39	3	5	4
Grade Totals								
Tenth	(244=100%)	6	25	20	35	6	6	-
Eleventh	(838=100%)	5	34	12	38	2	4	3
Twelfth	(590=100%)	6	30	10	40	3	4	5
Total Males	(755=100%)	6	33	13	36	4	4	3
School X:	(245=100%)	6	26	16	36	5	8	3
Tenth	(117=100%)	8	23	18	34	8	9	-
Eleventh	(128=100%)	3	30	13	37	2	8	6
School Y:	(261=100%)	7	40	12	35	4	1	2
Eleventh	(123=100%)	6	40	16	30	6	1	1
Twelfth	(138=100%)	8	39	7	40	1	1	4
School Z:	(249=100%)	6	35	12	38	4	2	4
Eleventh	(124=100%)	6	38	12	40	1	2	2
Twelfth	(125=100%)	5	32	12	37	6	3	5
Total Females	(917=100%)	4	28	13	41	3	5	4
School X:	(288=100%)	6	28	18	40	2	4	2
Tenth	(127=100%)	4	27	23	36	3	4	1
Eleventh	(161=100%)	7	28	13	43	-	5	2
School Y:	(341=100%)	4	29	10	42	4	3	7
Eleventh	(162=100%)	3	36	11	36	4	2	7
Twelfth	(179=100%)	5	22	9	49	3	4	7
School Z:	(288=100%)	4	28	12	40	3	8	4
Eleventh	(140=100%)	3	31	10	44	2	8	1
Twelfth	(148=100%)	5	26	14	36	4	9	6

Note: There is no table for Question #4 because these responses were not scored.

QUESTION #6: "WHAT WAS STUDENT DOING WHEN INTERACTION BEGAN?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Waiting for Specific Activity To Begin	Engaged in Specific Activity	Going to Specific Place	Roaming	Eating Lunch	Not Stated
		%	%	%	%	%	%
Grand Total	(1672=100%)	24	36	31	2	6	-
School X	(533=100%)	25	40	26	2	6	-
School Y	(602=100%)	26	31	37	-	4	-
School Z	(537=100%)	20	38	31	4	7	-
Grade Totals							
Tenth	(244=100%)	28	42	22	2	5	-
Eleventh	(838=100%)	24	34	33	1	6	-
Twelfth	(590=100%)	22	36	33	3	5	-
Total Males	(755=100%)	22	36	34	2	6	-
School X:	(245=100%)	23	43	25	4	4	-
Tenth	(117=100%)	23	50	21	3	2	-
Eleventh	(128=100%)	23	36	29	4	7	-
School Y:	(261=100%)	25	28	40	-	5	-
Eleventh	(123=100%)	27	30	36	-	6	-
Twelfth	(138=100%)	23	27	45	-	4	1
School Z:	(249=100%)	17	35	36	4	8	-
Eleventh	(124=100%)	20	31	39	2	5	-
Twelfth	(125=100%)	14	39	32	5	10	-
Total Females	(917=100%)	26	37	29	2	6	-
School X:	(288=100%)	28	37	27	-	7	-
Tenth	(127=100%)	32	34	24	1	8	-
Eleventh	(161=100%)	23	40	30	-	6	-
School Y;	(341=100%)	27	34	34	1	4	-
Eleventh	(162=100%)	25	31	38	-	5	-
Twelfth	(179=100%)	29	37	30	2	2	-
School Z:	(288=100%)	23	40	26	4	6	-
Eleventh	(140=100%)	26	38	26	2	8	-
Twelfth	(148=100%)	20	43	26	5	5	-

QUESTION #8: "HOW STUDENT TOOK PART IN INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Talked A Lot	Talked Some	Listened	Not Stated
		%	%	%	%
Grand Total	(1672=100%)	24	58	17	-
School X	(533=100%)	24	59	17	-
School Y	(602=100%)	25	57	17	-
School Z	(537=100%)	23	59	18	-
Grade Totals					
Tenth	(244=100%)	24	62	14	-
Eleventh	(838=100%)	25	58	17	-
Twelfth	(590=100%)	23	58	19	-
Total Males	(755=100%)	24	58	18	-
School X:	(245=100%)	21	61	18	-
Tenth	(117=100%)	18	66	16	-
Eleventh	(128=100%)	24	56	20	-
School Y:	(261=100%)	26	57	16	-
Eleventh	(123=100%)	32	55	13	-
Twelfth	(138=100%)	21	59	19	1
School Z:	(249=100%)	24	57	20	-
Eleventh	(124=100%)	23	60	17	-
Twelfth	(125=100%)	24	54	22	-
Total Females	(917=100%)	24	58	17	-
School X:	(288=100%)	27	57	16	-
Tenth	(127=100%)	29	58	13	-
Eleventh	(161=100%)	25	56	18	-
School Y:	(341=100%)	24	56	18	-
Eleventh	(162=100%)	22	57	20	-
Twelfth	(179=100%)	26	56	17	1
School Z:	(288=100%)	22	61	17	-
Eleventh	(140=100%)	23	61	16	-
Twelfth	(148=100%)	22	61	18	-

Note: There is no table for Question #7 because these responses were not scored.

QUESTION 9-A: "SINGLE-CONTENT OR MULTIPLE-CONTENT?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Single	Multiple Not Academic	Multiple Including Academic	Multiple All Academic	Not Stated
		%	%	%	%	%
Grand Total	(1672=100%)	75	10	11	4	-
School X	(533=100%)	77	8	12	2	-
School Y	(602=100%)	74	12	10	4	-
School Z	(537=100%)	75	8	11	5	-
Grade Totals						
Tenth	(244=100%)	76	10	11	2	-
Eleventh	(838=100%)	73	8	14	4	-
Twelfth	(590=100%)	78	11	6	4	-
Total Males	(755=100%)	77	9	10	3	-
School X:	(245=100%)	78	6	12	2	-
Tenth	(117=100%)	79	7	10	3	-
Eleventh	(128=100%)	78	6	13	2	-
School Y:	(261=100%)	74	14	10	2	-
Eleventh	(123=100%)	72	11	15	1	-
Twelfth	(138=100%)	77	16	4	2	1
School Z:	(249=100%)	79	7	8	4	-
Eleventh	(124=100%)	78	6	10	6	-
Twelfth	(125=100%)	80	8	6	3	1
Total Females	(917=100%)	73	10	12	5	-
School X:	(288=100%)	75	10	12	2	-
Tenth	(127=100%)	72	13	12	2	-
Eleventh	(161=100%)	78	8	12	2	-
School Y:	(341=100%)	72	10	10	7	-
Eleventh	(162=100%)	66	11	15	8	-
Twelth	(179=100%)	79	10	5	6	-
School Z:	(288=100%)	70	9	14	6	-
Eleventh	(140=100%)	66	8	18	8	-
Twelfth	(148=100%)	75	10	11	4	-

QUESTION 9-B: "CONTENT RELATED TO?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 2237 responses)

		Course Work	Teachers, Admin.	School Events	College, Future	Personal-Social	Not Stated
		%	%	%	%	%	%
Grand Total	(2237=100%)	27	7	13	3	47	2
School X	(706=100%)	23	6	14	2	52	2
School Y	(822=100%)	28	6	12	4	48	1
School Z	(709=100%)	30	10	13	3	40	4
Grade Totals							
Tenth	(321=100%)	24	6	14	1	51	2
Eleventh	(1157=100%)	27	8	13	2	47	2
Twelfth	(759=100%)	28	8	12	5	43	3
Total Males	(964=100%)	25	8	14	3	47	3
School X:	(311=100%)	23	8	14	3	50	2
Tenth	(146=100%)	27	6	11	2	49	5
Eleventh	(165=100%)	19	9	16	4	50	-
School Y:	(344=100%)	26	5	12	3	52	2
Eleventh	(168=100%)	29	5	12	3	49	2
Twelfth	(176=100%)	22	5	13	3	55	1
School Z:	(309=100%)	27	11	14	3	40	6
Eleventh	(154=100%)	28	10	14	1	44	5
Twelfth	(155=100%)	26	12	15	5	35	8
Total Females	(1273=100%)	28	6	13	3	46	2
School X:	(395=100%)	23	4	16	1	54	1
Tenth	(175=100%)	22	6	17	1	53	-
Eleventh	(220=100%)	24	3	14	1	56	2
School Y:	(478=100%)	30	8	12	4	44	1
Eleventh	(247=100%)	32	8	12	3	42	1
Twelfth	(231=100%)	29	7	11	6	45	1
School Z:	(400=100%)	32	8	12	4	40	2
Eleventh	(203=100%)	32	11	12	-	43	1
Twelfth	(197=100%)	33	6	11	7	38	4

Note: The number of responses for this item is more than for other tables, because interactions dealing with more than one topic are counted more than once.

QUESTION #10: "STUDENT'S MAIN PURPOSE IN PARTICIPATING IN INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Exchange Information, Opinions, or Ideas	Be Friendly, Gripe, or Kill Time	Both Informational and Social-Emotional	Not Stated
		%	%	%	%
Grand Total	(1672=100%)	54	35	8	2
School X	(533=100%)	54	35	8	1
School Y	(602=100%)	52	34	10	2
School Z	(537=100%)	54	36	6	3
Grade Totals					
Tenth	(244=100%)	54	36	7	2
Eleventh	(838=100%)	52	37	8	1
Twelfth	(590=100%)	56	31	9	4
Total Males	(755=100%)	52	37	6	4
School X:	(245=100%)	50	40	6	2
Tenth	(117=100%)	50	38	8	4
Eleventh	(128=100%)	51	43	5	-
School Y:	(261=100%)	48	36	11	4
Eleventh	(123=100%)	46	40	10	4
Twelfth	(138=100%)	52	31	12	4
School Z:	(249=100%)	58	34	2	5
Eleventh	(124=100%)	52	44	2	1
Twelfth	(125=100%)	64	25	2	9
Total Females	(917=100%)	55	33	10	1
School X:	(288=100%)	58	30	10	-
Tenth	(127=100%)	57	35	6	1
Eleventh	(161=100%)	60	25	14	-
School Y:	(341=100%)	56	32	10	1
Eleventh	(162=100%)	56	31	11	1
Twelfth	(179=100%)	56	34	9	1
School Z:	(288=100%)	50	38	11	-
Eleventh	(140=100%)	49	41	8	1
Twelfth	(148=100%)	51	34	14	-

QUESTION #11: "WAS STUDENT'S PURPOSE ACCOMPLISHED?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Yes	No	Partly	Not Stated
		%	%	%	%
Grand Total	(1672=100%)	79	6	14	-
School X	(533=100%)	80	7	13	-
School Y	(602=100%)	79	5	16	-
School Z	(537=100%)	79	5	14	-
Grade Totals					
Tenth	(244=100%)	78	8	14	-
Eleventh	(838=100%)	78	6	15	-
Twelfth	(590=100%)	82	4	14	-
Total Males	(755=100%)	78	6	15	-
School X:	(245=100%)	80	8	12	-
Tenth	(117=100%)	82	8	9	1
Eleventh	(128=100%)	79	7	14	-
School Y:	(261=100%)	78	5	17	-
Eleventh	(123=100%)	78	7	14	-
Twelfth	(138=100%)	77	3	20	-
School Z:	(249=100%)	76	7	16	-
Eleventh	(124=100%)	71	8	20	-
Twelfth	(125=100%)	82	6	11	1
Total Females	(917=100%)	80	5	14	-
School X:	(288=100%)	79	6	14	-
Tenth	(127=100%)	73	8	18	-
Eleventh	(161=100%)	85	4	11	-
School Y:	(341=100%)	80	6	14	-
Eleventh	(162=100%)	76	7	17	-
Twelfth	(179=100%)	84	4	11	-
School Z:	(288=100%)	82	4	14	-
Eleventh	(140=100%)	81	3	14	1
Twelfth	(148=100%)	83	4	13	-

QUESTION #12: "AMOUNT OF TIME SPENT ON INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Up to 2 Minutes	3 to 4 Minutes	5 to 10 Minutes	Over 10 Minutes	Not Stated
		%	%	%	%	%
Grand Total	(1672=100%)	46	24	22	6	1
School X	(533=100%)	35	24	31	10	-
School Y	(602=100%)	55	24	15	5	-
School Z	(537=100%)	50	23	21	4	1
Grade Totals						
Tenth	(244=100%)	33	26	30	10	-
Eleventh	(838=100%)	45	25	22	6	-
Twelfth	(590=100%)	56	20	18	4	-
Total Males	(755=100%)	47	24	21	7	-
School X:	(245=100%)	38	22	30	10	-
Tenth	(117=100%)	35	23	32	10	-
Eleventh	(128=100%)	40	22	28	10	-
School Y:	(261=100%)	53	24	16	8	-
Eleventh	(123=100%)	44	28	16	11	-
Twelfth	(138=100%)	62	19	15	4	-
School Z:	(249=100%)	51	26	18	4	1
Eleventh	(124=100%)	54	29	13	2	2
Twelfth	(125=100%)	48	22	23	6	-
Total Females	(917=100%)	46	24	23	5	1
School X:	(288=100%)	32	25	32	9	1
Tenth	(127=100%)	31	29	28	11	-
Eleventh	(161=100%)	33	21	35	7	2
School Y:	(341=100%)	56	26	14	2	1
Eleventh	(162=100%)	53	28	14	2	2
Twelfth	(179=100%)	60	23	14	2	-
School Z:	(288=100%)	48	21	24	5	1
Eleventh	(140=100%)	44	24	25	6	-
Twelfth	(148=100%)	53	18	22	4	2

QUESTION #13: "SUFFICIENT TIME FOR INTERACTION?"

Responses to Inventory by School, Grade, and Sex

(n = 300 subjects; 1672 responses)

		Yes	No - Partly Rushed	No - Very Rushed	Not Stated
		%	%	%	%
Grand Total	(1672=100%)	67	24	9	-
School X	(533=100%)	69	23	7	-
School Y	(602=100%)	66	22	12	-
School Z	(537=100%)	66	27	7	-
Grade Totals					
Tenth	(244=100%)	70	21	8	-
Eleventh	(838=100%)	66	24	9	-
Twelfth	(590=100%)	68	23	9	-
Total Males	(755=100%)	69	22	9	-
School X:	(245=100%)	74	18	7	-
Tenth	(117=100%)	77	12	9	1
Eleventh	(128=100%)	71	24	5	-
School Y:	(261=100%)	67	21	12	-
Eleventh	(123=100%)	70	20	10	-
Twelfth	(138=100%)	64	22	14	-
School Z:	(249=100%)	66	26	8	-
Eleventh	(124=100%)	60	31	9	-
Twelfth	(125=100%)	71	21	8	-
Total Females	(917=100%)	66	26	8	-
School X:	(288=100%)	64	28	8	-
Tenth	(127=100%)	63	30	7	-
Eleventh	(161=100%)	65	27	8	-
School Y:	(341=100%)	65	23	12	-
Eleventh	(162=100%)	60	25	15	-
Twelfth	(179=100%)	70	21	9	-
School Z:	(288=100%)	68	28	6	-
Eleventh	(140=100%)	69	25	6	-
Twelfth	(148=100%)	66	30	5	-

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